AQA GCSE Biology | 8461

SPECIFICATION POINT 4.1.1.2

Animal and plant cells

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**42**
Available paper years	**2008–2025**

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.

4.1.1.2 Animal and plant cells

Answer 01 · Mark scheme

Question 1

	answers	extra information	mark
(a)	**A** nucleus **B** (cell) membrane **C** cytoplasm		1 1 1
(b)	any **two** from: • (contain) mitochondria • many (mitochondria) • respiration (occurs in mitochondria)		2
total			5

4.1.1.2 Animal and plant cells

Answer 01 · Mark scheme January 2008 | BLY2F | Original Q1 | Legacy

BLY2F

Answer 02 · Mark scheme June 2008 | BLY2F | Original Q1 | Legacy

question	answers	extra information	mark
1(a)	**A** nucleus		1
	B (cell) membrane		1
	C cytoplasm		1
1(b)(i)	it is thin		1
1(b)(ii)	diffusion		1
Total			**5**

4.1.1.2 Animal and plant cells

Answer 03 · Mark scheme

June 2008 | BLY3F | Original Q1 | Legacy

question	answers	extra information	mark
1(a)	A = nucleus B = cell wall		1 1
1(b)(i)	carbon dioxide		1
1(b)(ii)	respiration		1
1(c)(i)	amount of flour / yeast / water / dough **or** type of flour / yeast / dough		1
1(c)(ii)	35		1
Total			**6**

4.1.1.2 Animal and plant cells

Answer 03 · Mark scheme

June 2008 | BLY3F | Original Q1 | Legacy

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: June 2008

4.1.1.2 Animal and plant cells

Answer 04 · Mark scheme

June 2008 | BLY3F | Original Q4 | Legacy

question	answers	extra information	mark
4(a)(i)	red cell		1
4(a) (ii)	diffusion		1
4(a) (iii)	haemoglobin		1
4(a) (iv)	a nucleus		1
4(b)	(on diagram) arrow from any part of blood to air		1
Total			**5**

4.1.1.2 Animal and plant cells

Answer 04 · Mark scheme

June 2008 | BLY3F | Original Q4 | Legacy

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: June 2008

4.1.1.2 Animal and plant cells

Answer 05 · Mark scheme

January 2009 | BLY2F | Original Q1 | Legacy

question	answers	extra information	mark
1(a)(i)	A cytoplasm B nucleus	accept clear indications	1 1
1(a)(ii)	any **two** from: • P • R • T	**two** required for **1** mark accept lower case letters	1
1(b)	sperm cells need a lot of energy to swim		1
Total			**4**

4.1.1.2 Animal and plant cells

Answer 05 · Mark scheme January 2009 | BLY2F | Original Q1 | Legacy

COMPONENT NUMBER: BLY2F

COMPONENT NAME: Additional Science / Biology

STATUS: Final

DATE: January 2009

Answer 06 · Mark scheme January 2009 | BLY3F | Original Q1 | Legacy

The full source mark scheme begins on page 82. Follow original question 1 in that document.

4.1.1.2 Animal and plant cells

Answer 07 · Mark scheme June 2009 | BLY2F | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)	it has many chloroplasts.		1
1(b)	(has) cell wall	assume plant cell throughout accept converse for animal cell	1
	(has) vacuole **or** large / permanent vacuole	do **not** allow chloroplasts	1
Total			**3**

4.1.1.2 Animal and plant cells

Answer 07 · Mark scheme

June 2009 | BLY2F | Original Q1 | Legacy

BLY2F

4.1.1.2 Animal and plant cells

Answer 08 · Mark scheme June 2009 | BLY2F | Original Q2 | Legacy

Question 2

question	answers	extra information	mark
2(a)	A		1
2(b)(i)	diffusion		1
2(b)(ii)	respiration		1
2(b)(iii)	mitochondria		1
2(b)(iv)	photosynthesis		1
Total			**5**

4.1.1.2 Animal and plant cells

Answer 08 · Mark scheme

June 2009 | BLY2F | Original Q2 | Legacy

BLY2F

4.1.1.2 Animal and plant cells

Answer 09 · Mark scheme

Question 2

question	answers	extra information	mark
2(a)(i)	sex cells		1
2(a)(ii)	chromosomes		1
2(b)(i)	two		1
2(b)(ii)	recessive		1
2(c)(i)	cell membrane	allow membrane	1
2(c)(ii)	cytoplasm		1
2(d)(i)	A		1
2(d)(ii)	B		1
Total			**8**

4.1.1.2 Animal and plant cells

Answer 09 · Mark scheme

January 2010 | BLY2F | Original Q2 | Legacy

BLY2F

4.1.1.2 Animal and plant cells

Answer 10 · Mark scheme

June 2010 | BLY2F | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)(i)	C and D		1
1(a)(ii)	cell wall		1
1(b)(i)	A		1
1(b)(ii)	D		1
1(c)	respiration		1
Total			**5**

4.1.1.2 Animal and plant cells

Answer 10 · Mark scheme

June 2010 | BLY2F | Original Q1 | Legacy

BLY2F

4.1.1.2 Animal and plant cells

Answer 11 · Mark scheme

June 2010 | BLY3F | Original Q7 | Legacy

Question 7

question	answers	extra information	mark
7(a)(i)	A = (cell) wall B = cytoplasm	ignore cellulose	1 1
7(a)(ii)	any **one** from • bacterial cell / it has no nucleus • DNA free in cytoplasm • has no vacuole / no vesicles	 accept has DNA instead of a nucleus but **not** just has DNA allow no mitochondria ignore size ignore strands of DNA	1
7(b)(i)	yeast grows best / better / well **or** optimum temperature for yeast / more yeast present CO_2 made(by yeast) **or** respires / respiration (by yeast)	allow yeast works best / better / well allow fermentation (ignore anaerobic/aerobic)	1 1
7(b)(ii)	bacterium grows best / better / well / more bacteria present **or** optimum temperature for bacterium (lactic) acid made (by bacterium)	ignore micro organism / microbes allow works / respires best / better / well (ignore anaerobic/aerobic) do **not** allow wrong acid	1 1
7(b)(iii)	bread still rises (in acid conditions) **or** no need to control / monitor pH		1
Total			**8**

4.1.1.2 Animal and plant cells

Answer 11 · Mark scheme June 2010 | BLY3F | Original Q7 | Legacy

BLY 3F

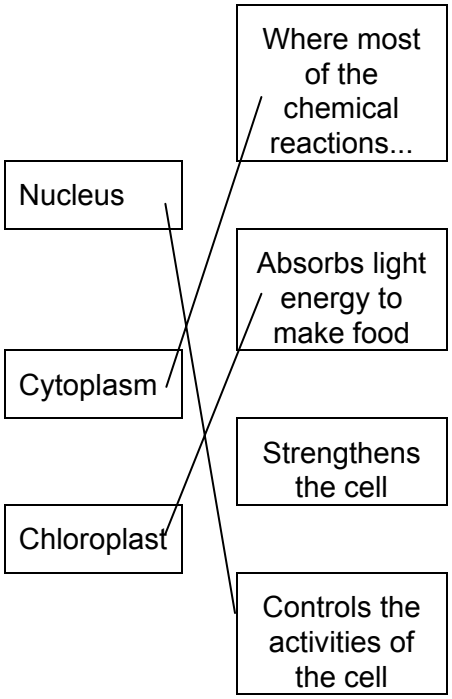
Answer 12 · Mark scheme November 2010 | BLY1BP | Original Q2 | Legacy

Two	**A**	A skin cell is taken from a donor.	**1**
	B	The new cell divides to make a group of similar cells.	**3**
	C	Different types of body cell are produced.	**4**
	D	The nucleus is removed, leaving cytoplasm.	**2**

4.1.1.2 Animal and plant cells

Answer 13 · Mark scheme

Question 1

question	answers	extra information	mark
1(a)		**1** mark for each correct line mark each line from left hand box two lines from left hand box cancels mark for that box	3
1(b)	energy		1
Total			**4**

4.1.1.2 Animal and plant cells

Answer 13 · Mark scheme

January 2011 | BLY2F | Original Q1 | Legacy

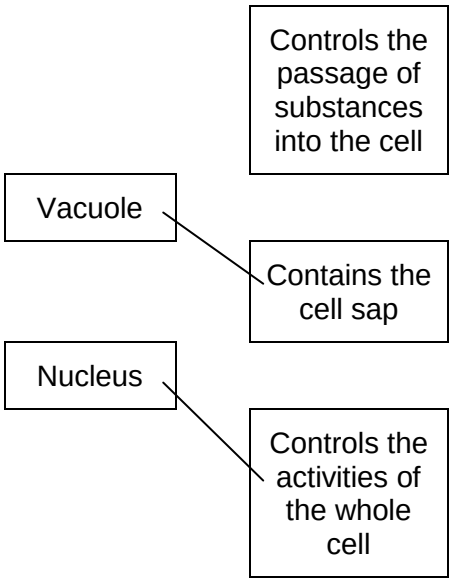
BLY2F

4.1.1.2 Animal and plant cells

Answer 14 · Mark scheme

June 2011 | BLY2F | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)(i)	tissue	extra box ticked cancels the mark	1
1(a)(ii)	organ	extra ring drawn cancels the mark	1
1(b)(i)	Layer B Layer C	each extra box ticked cancels **1** mark	1 1
1(b)(ii)	(contain) chloroplasts / chlorophyll	other parts disqualify	1
1(c)		two correct = **2** marks one correct = **1** mark extra line from a part of a cell cancels the mark	2
Total			**7**

4.1.1.2 Animal and plant cells

Answer 14 · Mark scheme

June 2011 | BLY2F | Original Q1 | Legacy

BLY2F

4.1.1.2 Animal and plant cells

Answer 15 · Mark scheme

June 2011 | BLY2F | Original Q9 | Legacy

Question 9

question	answers	extra information	mark
9(a) E	because water enters (the cell / it / named cell)	do **not** accept salt / sugar / solution entering	1
	by osmosis / diffusion	if osmosis / diffusion not given accept concentration inside cell greater than outside cell assume concentration refers to solute concentration unless answer indicates otherwise allow water goes up the concentration gradient allow water goes down its concentration gradient do **not** accept if diffusion of salt / sugar	1
	through a partially permeable membrane	allow semi / selectively permeable membrane **or** description	1
9(b) E	(plant cells) have (cell) wall	accept animal cells have no (cell) wall ignore reference to cell membrane do **not** accept reference to other organelles **or** any implication that animal cells have a cell wall eg plant cells have a thicker cell wall	1
Total			**4**

The AQA UMS Conversion Calculator is available on the Results statistics page of the AQA Website

4.1.1.2 Animal and plant cells

Answer 16 · Mark scheme

June 2012 | BL1FP | Original Q4 | Legacy

Question 4

question	answers	extra information	mark
4 (a)	too cold / very cold **or** oxygen / microbes cannot reach it	allow not enough energy / heat / warmth ignore frozen	1
	for microorganisms / microbes / bacteria / fungi / enzyme / reaction (to work)	ignore other consumers	1
4 (b)	no longer exist **or** no more left **or** died out / all died	ignore died unqualified	1
4 (c)(i)	egg cell		1
4 (c)(ii)	nucleus		1
4 (c)(iii)	given an electric shock		1
4 (c)(iv)	womb		1
4 (d)	has mammoth genes / chromosomes	accept genetic information / DNA / alleles / nucleus accept converse	1
Total			**8**

4.1.1.2 Animal and plant cells

Answer 16 · Mark scheme

June 2012 | BL1FP | Original Q4 | Legacy

BL1FP

4.1.1.2 Animal and plant cells

Answer 17 · Mark scheme

June 2012 | BL2FP | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)(i)	(cell) membrane		1
1(a)(ii)	vacuole		1
1(b)	any **two** from: • (cell) wall • chloroplast(s) • vacuole	 ignore chlorophyll ignore cell sap	2
1(c)	diffusion		1
Total			**5**

4.1.1.2 Animal and plant cells

Answer 17 · Mark scheme

June 2012 | BL2FP | Original Q1 | Legacy

BL2FP

4.1.1.2 Animal and plant cells

Answer 18 · Mark scheme

Question 1

question	answers	extra information	mark
1(a)(i)	A = nucleus B = (cell) membrane		1 1
1(a)(ii)	any **two** from: • no (cell) wall • no (large / permanent) vacuole • no chloroplasts / chlorophyll	ignore shape	2
1(b)	because high to low oxygen / concentration **or** down gradient	allow 'more / a lot of oxygen molecules outside' ignore along / across gradient	1
1(c)	a tissue		1
Total			**6**

4.1.1.2 Animal and plant cells

Answer 18 · Mark scheme

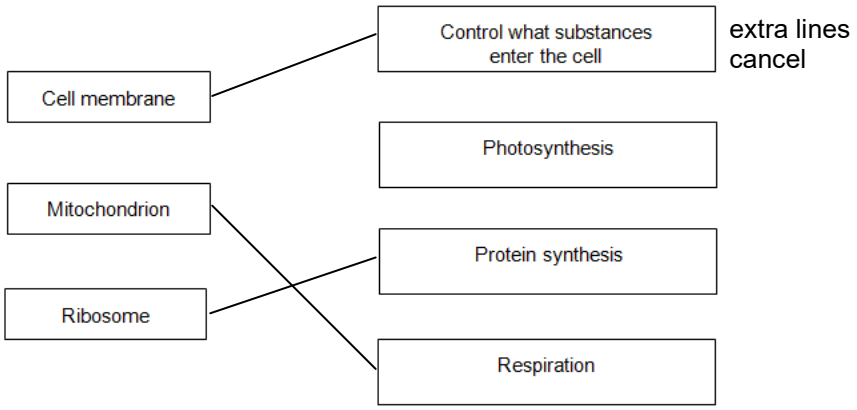
January 2013 | BL2FP | Original Q1 | Legacy

BL2FP

4.1.1.2 Animal and plant cells

Answer 19 · Mark scheme June 2013 | BL2FP | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)(i)	A = cytoplasm B = (cell) membrane		1 1
1(a)(ii)	nucleus	accept chromosome / DNA / genes accept phonetic.	1
1(b)		extra lines cancel	3
Total			**6**

4.1.1.2 Animal and plant cells

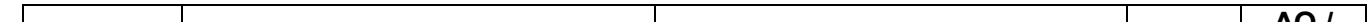
Answer 20 · Mark scheme

Question	Answers	Extra information	Mark	AO / spec ref.
1(a)(i)	Chromosomes		1	AO1 1.7.1b
1(a)(ii)	Characteristics		1	AO1 1.7.1b
1(a)(iii)	Classify		1	AO1 1.8.1d
1(b)	Plants	ignore algae	1	AO1 1.8.1d
Total			4	

4.1.1.2 Animal and plant cells

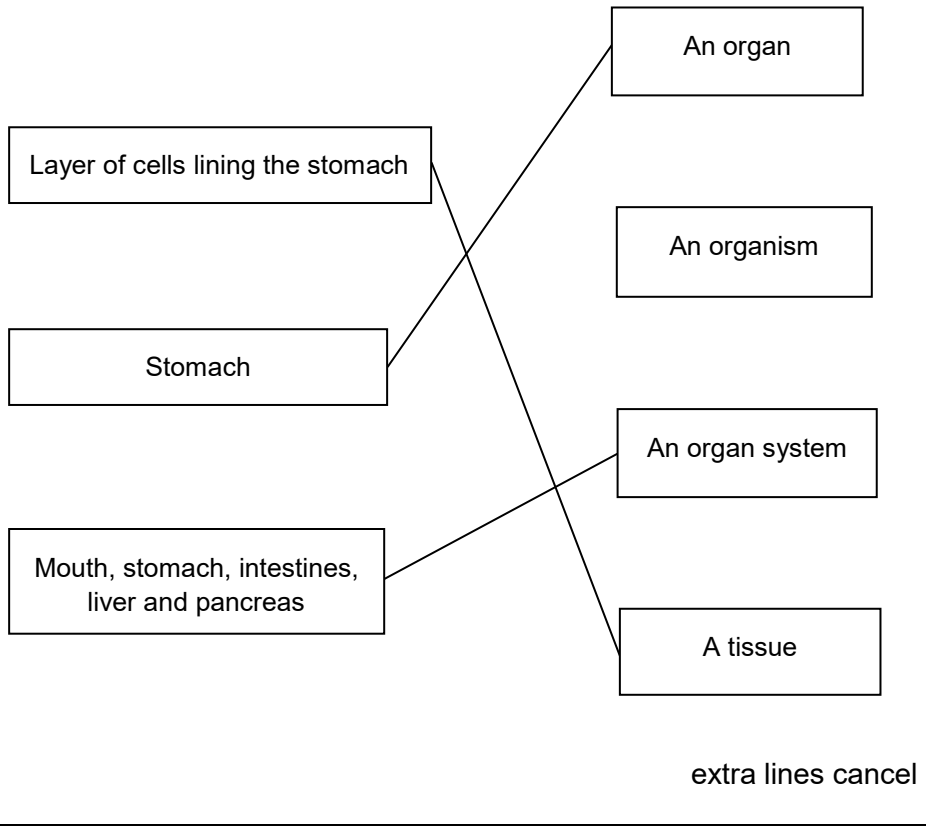
Answer 20 · Mark scheme

June 2014 | BL1FP | Original Q1 | Legacy



4.1.1.2 Animal and plant cells

Answer 21 · Mark scheme June 2014 | BL2FP | Original Q1 | Legacy

1(a)(i)	A = (cell) membrane B = cytoplasm	 do **not** accept cytoplast	1 1	AO1 2.1.1a
1(a)(ii)	To control the activities of the cell		1	AO1 2.1.1a
1(b)	 extra lines cancel		3	AO1 2.2.1b, c,d
Total			**6**	

4.1.1.2 Animal and plant cells

Answer 21 · Mark scheme

June 2014 | BL2FP | Original Q1 | Legacy

Question	Answers	Extra information	Mark	AO / spec ref.

4.1.1.2 Animal and plant cells

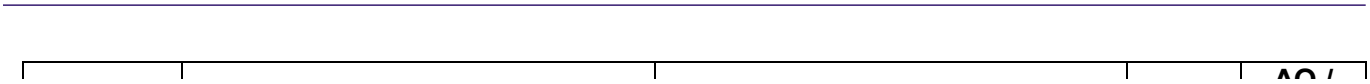
Answer 22 · Mark scheme June 2014 | BL3FP | Original Q3 | Legacy

Question	Answers	Extra information	Mark	AO / spec ref.
3(a)	osmosis partially permeable		1 1	AO1 3.1.1b
3(b)(i)	any **two** from: • vacuole is small(er) • cytoplasm has shrunk • gap between cytoplasm and cell wall • cell wall curves inwards • the (cell) membrane has moved away from the wall	allow correct answers in terms of A allow cytoplasm is smaller allow cell B is flaccid or cell A is turgid	2	AO2 3.1.1
3(b)(ii)	any **one** from: • water will move / diffuse in • (cells) will swell • (cells) will burst	ignore turgid	1	AO2 3.1.1c
3(c)	villi give the small intestines a large surface area villi have many blood capillaries		1 1	AO1 3.1.1k,j,l
Total			7	

4.1.1.2 Animal and plant cells

Answer 22 · Mark scheme

June 2014 | BL3FP | Original Q3 | Legacy



4.1.1.2 Animal and plant cells

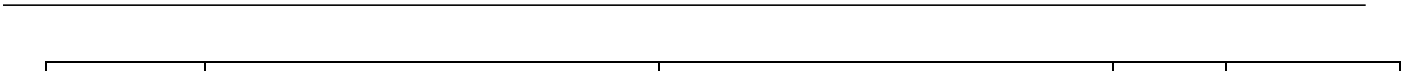
Answer 23 · Mark scheme June 2015 | BL1FP | Original Q1 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)(i)	stimulus		1	AO1 1.2.1b
1(a)(ii)	cytoplasm		1	AO1 1.2.1c
1(b)(i)		in this order only		AO2
	ear(s)		1	1.2.1b
	eye(s)	accept retina	1	
	skin	ignore extra detail	1	
1(b)(ii)	A muscle		1	AO2 1.2.1e
Total			6	

4.1.1.2 Animal and plant cells

Answer 23 · Mark scheme

June 2015 | BL1FP | Original Q1 | Legacy



4.1.1.2 Animal and plant cells

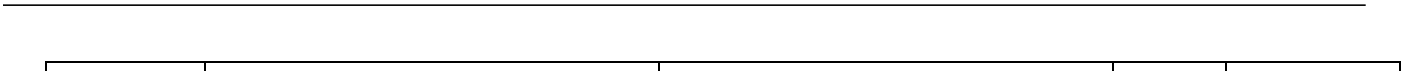
Answer 24 · Mark scheme June 2015 | BL1FP | Original Q4 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4(a)	Taking cuttings from plants		1	AO1 1.7.2a/b
4(b)(i)	Adult cell cloning		1	AO2 1.7.2c
4(b)(ii)	an egg cell		1	AO2 1.7.2c
4(b)(iii)	nucleus		1	AO1 1.7.2c
4(b)(iv)	an electric shock		1	AO1 1.7.2c
4(b)(v)	uterus / womb	accept phonetic spelling	1	AO1 1.7.2c
4(c)	any **two** from: • unethical / immoral • cloned child would have to give up a kidney • possible operation complications	 allow 'rights' of the cloned child allow against religious teachings allow illegal allow parents may not want another child allow a long time to wait (for the kidney)	2	AO3 1.7
Total			**8**	

4.1.1.2 Animal and plant cells

Answer 24 · Mark scheme

June 2015 | BL1FP | Original Q4 | Legacy



4.1.1.2 Animal and plant cells

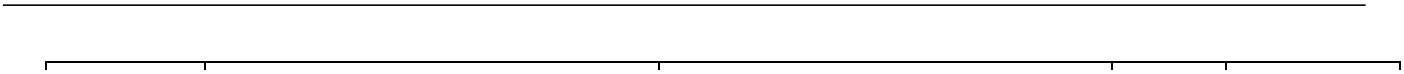
Answer 25 · Mark scheme June 2015 | BL2FP | Original Q4 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4(a)(i)	LHS = water RHS = oxygen	accept H_2O do **not** accept H^2O / H2O accept O_2 do **not** accept O / O^2 / O2	1 1	AO1 2.3.1a,b
4(a)(ii)	light / sunlight	ignore solar / sun / sunshine do **not** allow thermal / heat	1	AO1 2.3.1a,b
4(a)(iii)	chloroplasts	allow chlorophyll	1	AO1 2.3.1b
4(b)(i)	20		1	AO2 2.3
4(b)(ii)	any **one** from: • light (intensity) • temperature		1	AO2 2.3, 2.3.1c,d
4(c)(i)	To increase the rate of growth of the tomato plants		1	AO2 2.3, 2.3.1c,d
4(c)(ii)	Because it would cost more money than using 0.08% Because it would not increase the rate of photosynthesis of the tomato plants any further		1 1	AO2 2.3, 2.3.1c,d
Total			**9**	

4.1.1.2 Animal and plant cells

Answer 25 · Mark scheme

June 2015 | BL2FP | Original Q4 | Legacy



4.1.1.2 Animal and plant cells

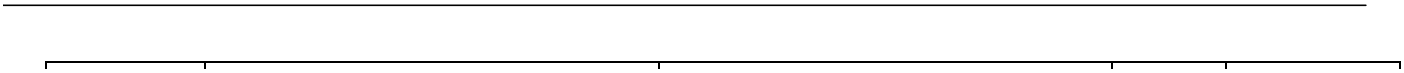
Answer 26 · Mark scheme June 2016 | BL2FP | Original Q1 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)	**Cell part** / **Function** Cell membrane → Controls the movement of substances into and out of the cell Mitochondria → Where most energy is released in respiration Nucleus → Controls the activities of the cell Where proteins are made extra lines cancel		3	AO1 2.1.1a
1(b)	Cell wall Chloroplast	in either order allow (permanent) vacuole	1 1	AO1 2.1.1b
Total			**5**	

4.1.1.2 Animal and plant cells

Answer 26 · Mark scheme

June 2016 | BL2FP | Original Q1 | Legacy



4.1.1.2 Animal and plant cells

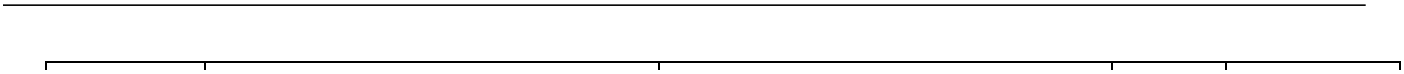
Answer 27 · Mark scheme June 2017 | BL2FP | Original Q1 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)(i)	photosynthesis		1	AO1 2.3
1(a)(ii)	light		1	AO1 2.3
1(b)(i)	chlorophyll	allow phonetic spelling	1	AO1 2.1.1b 2.3.1b
1(b)(ii)	traps / absorbs light **or** traps / absorbs energy	ignore provides energy ignore stores energy	1	AO1 2.1.1b 2.3.1b
1(b)(iii)	transport	ignore names of substances but do **not** allow large molecules – e.g. starch / protein do **not** allow energy allow support (of leaf)	1	AO1 2.2.2b
1(b)(iv)	carbon dioxide / CO_2 water / H_2O	in either order ignore light do **not** allow CO^2 / H^2O	1 1	AO1 2.3.1a/b
Total			**7**	

4.1.1.2 Animal and plant cells

Answer 27 · Mark scheme

June 2017 | BL2FP | Original Q1 | Legacy



4.1.1.2 Animal and plant cells

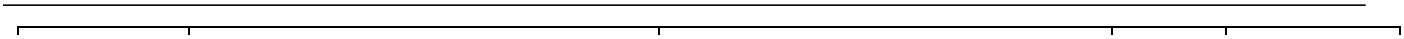
Answer 28 · Mark scheme June 2017 | BL2FP | Original Q6 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)(i)	surface of organ(s)	allow covering / lining organ allow named example of an organ, e.g. surface of stomach allow the skin	1	AO1 2.2.1b/c
6(a)(ii)	**A** (cell) membrane **B** cytoplasm	allow phonetic spelling allow cell surface membrane do **not** allow (cell) wall	1 1	AO1 2.1.1a
6(b)	Protein synthesis		1	AO1 2.1.1a
6(c)	movement of <u>particles</u> / <u>molecules</u> from high to low concentration / down a concentration gradient	allow movement of ions / atoms ignore carbon dioxide / other named substance ignore along / across gradient ignore through membrane	1 1	AO1 2.1 2.1.2a/b
Total			**6**	

4.1.1.2 Animal and plant cells

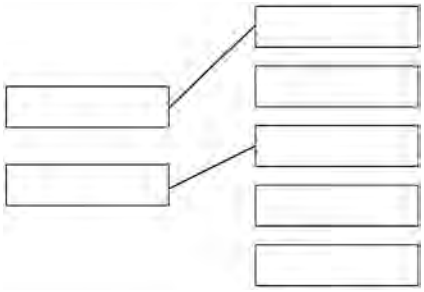
Answer 28 · Mark scheme

June 2017 | BL2FP | Original Q6 | Legacy



4.1.1.2 Animal and plant cells

Answer 29 · Mark scheme June 2018 | 8461/1F | Original Q2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1		additional line from a level of organisation negates the mark for that level of organisation	2	AO1 4.2.1 4.2.3.1
02.2	palisade mesophyll		1	AO2 4.2.3.1
02.3	$\frac{50}{8}$ 6 / 6.25 / 6.3 (micrometres)	an answer of 6 / 6.25 / 6.3 scores **2** marks	1 1	AO2 4.1.1.2
02.4	they have no chloroplasts / chlorophyll	allow they are underground allow they don't get (access to) light allow (because) photosynthesis needs light allow they can't absorb light ignore 'sun' ignore 'it is dark'	1	AO2 4.1.1.3 4.4.1.1
02.5	differentiation		1	AO1 4.1.1.4 4.1.2.3
02.6	to protect endangered plants from extinction		1	AO1 4.1.2.3

4.1.1.2 Animal and plant cells

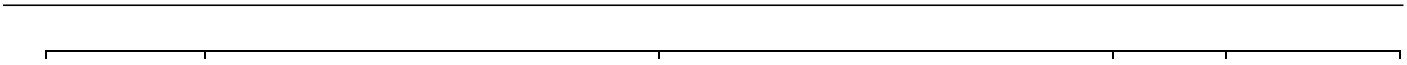
Answer 29 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.7	plants can be produced quickly		1	AO1 4.1.2.3
02.8	any **one** from: • glucose / sugars / starch • amino acids / protein • hormones • ions / minerals • vitamins • water	allow named hormones eg auxin allow magnesium / nitrate allow named vitamins e.g. vitamin B allow H_2O / H2O ignore oxygen / carbon dioxide / agar / nutrients / fertiliser	1	AO2 4.1.2.3
Total			**10**	

4.1.1.2 Animal and plant cells

Answer 29 · Mark scheme

June 2018 | 8461/1F | Original Q2



4.1.1.2 Animal and plant cells

Answer 30 · Mark scheme June 2019 | 8461/1F | Original Q7

07.1	controls the (activities of the) cell	allow contains genetic information / genes / DNA / chromosomes do **not** accept brain do **not** accept controls substances entering / leaving the cell	1	4.1.1.2 AO1
07.2	red blood cell / RBC **or** bacteria / prokaryote **or** xylem (cell)	allow erythrocyte ignore blood cell unqualified ignore platelets allow named examples of bacteria do **not** accept virus	1	4.2.2.3 4.1.1.1 AO1
07.3	cell shape is similar to cell in **Figure 12 and** nucleus present any **two** features correctly identified and labelled: • nucleus • (cell) membrane • cytoplasm • mitochondria / mitochondrion • ribosome(s)	ignore shading do **not** accept a cell wall drawn allow cell wall if drawn and correctly labelled do **not** accept other plant sub-cellular structures	1 1	4.1.1.2 AO2 8.2.1 AO1
07.4	any **one** from: • (cellulose cell) wall • chloroplast • (permanent) vacuole	ignore chlorophyll allow starch grain	1	4.1.1.2 AO1

4.1.1.2 Animal and plant cells

Answer 30 · Mark scheme June 2019 | 8461/1F | Original Q7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.5		an answer of (×) 400 scores **3** marks an answer of (×) 40 scores **2** marks		4.1.1.5 AO2
	24 (mm) **or** 2.4 (cm)	allow in range 23 to 25 (mm) **or** in range 2.3 to 2.5 (cm)	1	
	$\frac{24}{0.06}$ **or** $\frac{2.4}{0.06}$	allow correct calculation from their measurement of **X** to **Y** in the range 2.3 cm to 3.5 cm **or** 23 mm to 35 mm	1	
	(×) 400	allow correct magnification derived from their measurement in **mm** ignore rounding errors	1	
07.6	high(er) magnification high(er) resolution **or** high(er) resolving power	ignore bigger / zoom allow see more detail if neither mark awarded allow **1** mark for see smaller objects **or** see smaller sub-cellular structures allow 3D image	1 1	4.1.1.5 AO1
Total			**10**	

4.1.1.2 Animal and plant cells

Answer 30 · Mark scheme June 2019 | 8461/1F | Original Q7

Question	Answers	Extra information	Mark	AO / Spec. Ref.

Answer 31 · Mark scheme November 2020 | 8461/1F | Original Q1

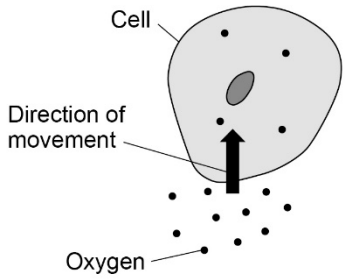
The full source mark scheme begins on page 95. Follow original question 1 in that document.

Answer 32 · Mark scheme November 2020 | 8461/1F | Original Q2

The full source mark scheme begins on page 95. Follow original question 2 in that document.

4.1.1.2 Animal and plant cells

Answer 33 · Mark scheme November 2021 | 8461/1F | Original Q1

01.1			1	AO3 4.1.3.1

01.2		in this order only		AO1 4.1.3.2 4.1.3.3 4.2.3.2
	water		1	
	mineral ions	allow minerals / ions	1	
	energy		1	

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**	AO1 4.1.1.3
	Contains a nucleus	To provide the chromosomes for fertilisation	1
	Has a long tail	To help the cell to swim to the egg	1
		To break the outer layer of the egg	
		To release energy	
	do **not** accept more than one line from a box on the left		

4.1.1.2 Animal and plant cells

Answer 33 · 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**	

4.1.1.2 Animal and plant cells

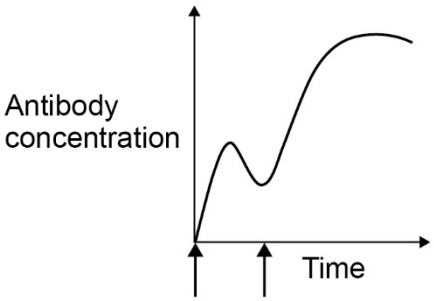
Answer 33 · Mark scheme

November 2021 | 8461/1F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.1.1.2 Animal and plant cells

Answer 34 · Mark scheme November 2021 | 8461/1F | Original Q2

02.1	pathogens		1	AO1 4.3.1.1
02.2	viruses reproduce inside cells, damaging them		1	AO1 4.3.1.1
02.3	any **one** from: • they do not have a cell membrane • they do not have cytoplasm • they do not have a nucleus • they do not have mitochondria (like most eukaryotic cells) • they do not have ribosomes	do **not** accept they do not have a cell wall do **not** accept they do not have chloroplasts / chlorophyll ignore they are not living / alive ignore they can only replicate inside cells ignore virus has a protein coat	1	AO2 4.1.1.2
02.4	a weakened form of a virus		1	AO1 4.3.1.7
02.5			1	AO2 4.3.1.7
02.6	leaf		1	AO1 4.3.1.2

4.1.1.2 Animal and plant cells

Answer 34 · Mark scheme

02.7	y-axis labelled rate of photosynthesis in arbitrary units correct scale all bars plotted correctly all bars correctly labelled	 allow a tolerance of ± ½ small square allow 2 correct bars for **1** mark allow bars touching allow any width of bars ignore letters	1 1 2 1	AO2 4.4.1.1
02.8	as the level of infection (with TMV) increases, (the rate of) photosynthesis decreases	allow as TMV increases, photosynthesis decreases allow (the rate of) photosynthesis decreases as the level of infection (with TMV) increases allow as infection gets worse, photosynthesis decreases allow TMV reduces photosynthesis	1	AO3 4.4.1.1
02.9	less chlorophyll (so) less glucose / starch / protein made	allow fewer chloroplasts allow less light absorbed ignore less photosynthesis	1 1	AO2 4.4.1.1 4.4.1.3 4.3.1.2
Total			**14**	

4.1.1.2 Animal and plant cells

Answer 34 · Mark scheme

November 2021 | 8461/1F | Original Q2

Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.1.1.2 Animal and plant cells

Answer 35 · Mark scheme November 2021 | 8461/1F | Original Q7

07.1	any **two** from: • (microscope) slide • cover slip • dye / stain • (mounted) needle • pipette / dropper • scalpel • forceps / tweezers	allow named dye / stain ignore water ignore knife allow swab (to collect cells)	2	AO1 4.1.1.5 RPA1
07.2	eyepiece / lens	do **not** accept objective lens	1	AO1 4.1.1.5 RPA1
07.3	to focus (the image / cells)	allow to make the cells / image clear(er) allow to improve resolution (of the image) ignore to move the stage up / down do **not** accept reference to magnification	1	AO1 4.1.1.5 RPA1
07.4	any **one** from: • no cells in the field of view • slide not in the correct position • mirror not in correct position • (objective) lens not clicked into place **or** (objective) lens dirty • (student is) looking at a (large) air bubble • (the microscope is) not focussed	allow light / microscope not switched on / plugged in allow student did not stain the cells allow idea of magnification not being high enough	1	AO3 4.1.1.5 RPA1

4.1.1.2 Animal and plant cells

Answer 35 · Mark scheme

November 2021 | 8461/1F | Original Q7

07.5	**Level 2:** Scientifically relevant features are identified; the way(s) in which they are similar/different is made clear and (where appropriate) the magnitude of the similarity/difference is noted.	4–6	AO2
	Level 1: Relevant features are identified and differences noted.	1–3	AO1
	No relevant content	0	
	Indicative Content **Differences:** • red blood cell has no nucleus **or** plant cell has a nucleus • red blood cell has no cell wall **or** plant cell has a cell wall • red blood cell is a biconcave disc **or** there are many different shapes of plant cell • red blood cell contains haemoglobin **or** plant cells do not contain haemoglobin • red blood cells do not contain chlorophyll **or** plant cells (may) contain chlorophyll • red blood cell has no chloroplasts **or** plant cell has chloroplasts • red blood cell has no (permanent) vacuole **or** plant cell has (permanent) vacuole • red blood cells are (much) smaller than plant cells **Similarities:** both have: • cytoplasm • cell membrane • pigments (although they are different) ignore references to mitochondria and ribosomes for **Level 2**, consideration of both red blood cells and plant cells is required.		4.1.1.2 4.2.2.3

07.6	water enters (the cells) by osmosis / diffusion	allow water enters **and** the cell starts to swell ignore explanations of osmosis	1	AO2
	plant cell has a cell wall (which prevents it from bursting)	allow red blood cell has no cell wall (so it swells and bursts)	1	AO1 4.1.3.2 4.1.1.2
Total			**13**	

4.1.1.2 Animal and plant cells

Answer 35 · Mark scheme

November 2021 | 8461/1F | Original Q7

Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.1.1.2 Animal and plant cells

Answer 36 · Mark scheme

June 2022 | 8461/1F | Original Q2

Question 2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	$\frac{1}{4}$		1	AO2 4.1.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.2	10		1	AO2 4.1.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.3	grows replicates divides	must be in this order	1 1 1	AO1 4.1.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.4	C		1	AO3 4.1.2.2

4.1.1.2 Animal and plant cells

Answer 36 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.5	10%		1	AO2 4.1.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.6	circulatory system		1	AO1 4.2.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.7	cardiovascular disease / CVD **or** (coronary) heart disease / CHD	allow heart attack allow any correctly named heart condition eg arrhythmia, hole in the heart	1	AO1 4.2.2.4 4.1.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.8	any **one** from: • unethical • (against) religious / cultural / personal beliefs • the method is not (fully) tested • risk of infection • (heart cells) may be rejected	 allow examples of unethical such as destroying a (potential) life allow against God's will ignore religion unqualified allow the method might not work allow may cause side effects	1	AO2 4.1.2.3 4.2.2.4

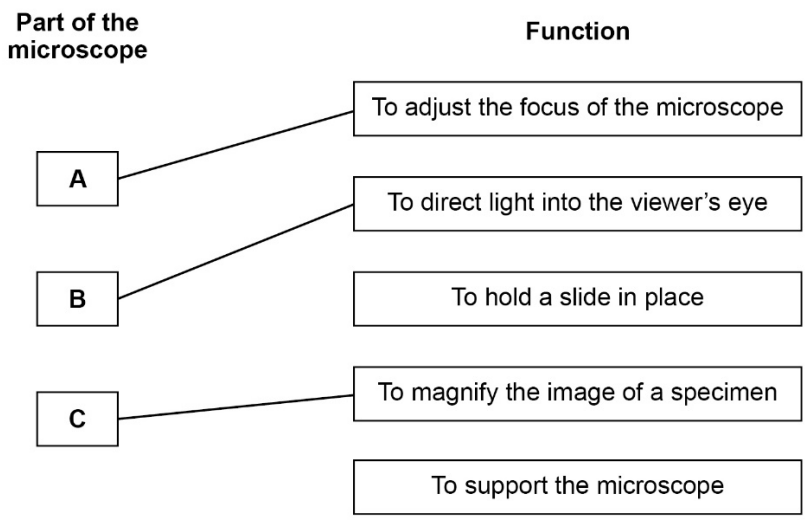
Total Question 2		**10**

4.1.1.2 Animal and plant cells

Answer 37 · Mark scheme

June 2022 | 8461/1F | Original Q4

Question 4

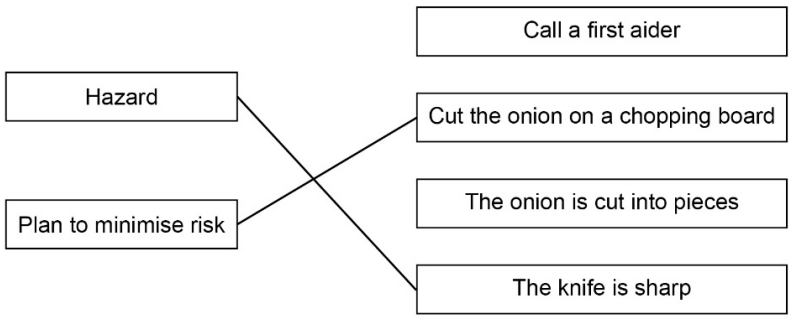
Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	 do **not** accept more than one line from a box on the left		1 1 1	AO2 4.1.1.2 RPA1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.2	to stain the cells		1	AO2 4.1.1.2 RPA1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	to allow light to pass through the cells		1	AO2 4.1.1.2 RPA1

4.1.1.2 Animal and plant cells

Answer 37 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	 do **not** accept more than one line from a box on the left		1 1	AO3 4.1.1.2 RPA1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5	*student's measurement* 49 (mm)	allow in range 48 – 50 (mm)	1	AO2 4.1.1.5 RPA1
	conversion of student's measurement 49 000 (µm)	allow correct conversion using student's measurement	1	
	substitution $\frac{49\,000}{400}$	allow a correct substitution using incorrectly measured / converted length	1	
	122.5 (µm)	allow a correct answer from student's division using a magnification of ×400	1	

4.1.1.2 Animal and plant cells

Answer 37 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.6	the cells would look larger the cells would show more internal structures		1 1	AO1 4.1.1.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.7	complete the cell walls include the magnification		1 1	AO3 4.1.1.5 RPA1

Total Question 4		**15**

4.1.1.2 Animal and plant cells

Answer 38 · Mark scheme

June 2022 | 8461/1F | Original Q7

Question 7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1		must be in this order		AO1 4.1.1.1 4.1.1.2
	nucleus	allow chromosomes allow plasmid	1	
	(site of aerobic) respiration	allow makes ATP **or** releases energy do **not** accept produces / makes / creates energy do **not** accept anaerobic respiration	1	
	(cell) membrane		1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.2	photosynthesis	allow produce glucose / sugar allow to absorb (sun) light ignore contains chlorophyll	1	AO1 4.1.1.2 4.4.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.3	root (hair)	allow xylem / phloem / epidermis / meristem	1	AO1 4.1.1.3 4.2.3.1 4.2.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.4	concentration of salt solution		1	AO1 4.1.3.2 RPA3

4.1.1.2 Animal and plant cells

Answer 38 · Mark scheme

June 2022 | 8461/1F | Original Q7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.5	to make sure **only** the potato mass was measured **or** if water / solution / liquid was left on (the potato), the mass would be higher / affected	allow (to) remove **excess** water / solution / liquid do **not** accept if water / solution / liquid was left on (potato) the mass would be lower ignore to remove water / solution / liquid on the outside / surface (of potato)	1	AO2 4.1.3.2 RPA3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.6	$\frac{0.2}{2.5} \times 100$ 8(%)	allow $\frac{2.7 - 2.5}{2.5} \times 100$ if no other mark awarded allow **1** mark for $\frac{2.5 - 2.7}{2.5} \times 100 = -8\ (\%)$	1 1	AO2 4.1.3.2 RPA3

4.1.1.2 Animal and plant cells

Answer 38 · Mark scheme

June 2022 | 8461/1F | Original Q7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.7 Mark with 07.8	correct scale **and** axis labelled (concentration (of salt solution) in mol/dm^3)	max **3** marks for bar chart scale must take up at least 50% of grid	1	AO2 4.1.3.2 RPA3
	all points plotted correctly	allow a tolerance of ± ½ small square allow 3 or 4 correct plots for **1** mark	2	
	curved line of best fit	ignore line extended beyond 0.4 mol/dm^3 ignore line joined point to point with straight lines	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.8 Mark with 07.7	correct answer from their line drawn on **Figure 9**	allow a tolerance of ± ½ small square ignore line joined point to point with straight lines if a line of best fit is drawn if no line of best fit is drawn, allow an answer in the range 0.31 – 0.33 (mol/dm^3)	1	AO2 4.1.3.2 RPA3

4.1.1.2 Animal and plant cells

Answer 38 · Mark scheme June 2022 | 8461/1F | Original Q7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.9		allow 'pieces' for potato throughout		AO2 4.1.3.2 RPA3
	<u>water</u> moves out of cells / potato		1	
	by osmosis	allow by diffusion through a partially / selectively / semi permeable membrane	1	
	(because) the solution in the cells / potato is less concentrated than outside **or** (because) the solution in the cells / potato is more dilute than outside	allow (because) the solution outside the cells / potato is more concentrated than inside allow (because) the solution outside the cells / potato is less dilute than inside allow correct references to <u>water concentration</u> / <u>potential</u> ignore reference to amount of water or salt do **not** accept water moves from an area of high (solute) concentration to an area of low (solute) concentration	1	

Total Question 7		**17**

Answer 39 · Mark scheme

June 2022 | 8461/1F | Original Q8

Question 8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	(cell) wall **or** (large / permanent) vacuole	ignore cellulose	1	AO3 4.1.1.1 4.1.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.2	rose black spot		1	AO1 4.3.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.3	$\frac{24 \times 60}{90}$ **or** $\frac{24}{1.5}$ 16	allow $\frac{1440}{90}$ do **not** accept if a unit is given	1 1	AO2 4.1.1.6 4.1.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.4	stomach		1	AO1 4.2.2.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.5	biuret reagent		1	AO1 4.2.2.1 RPA4

4.1.1.2 Animal and plant cells

Answer 39 · Mark scheme

June 2022 | 8461/1F | Original Q8

Question	Answers	Mark	AO / Spec. Ref.
08.6	**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	AO2
	Level 1: Relevant points are made. They are not logically linked.	1–2	AO1
	No relevant content.	0	4.2.2.1 4.2.2.4 4.2.2.5 4.2.2.6

	Indicative content
	
	• meat-free burgers contain more fibre
	  • aids digestion **or** prevents constipation
	
	• meat burgers contain more protein
	  • for growth
	
	• meat burgers contain more fat
	  • can cause CHD **or** heart attack **or** narrowing of arteries
	  • may lead to needing a stent
	  • may lead to obesity
	  • obesity is a risk factor for (type 2) diabetes
	
	• meat burgers contain more cholesterol
	  • can cause narrowing of arteries **or** CHD **or** heart attack
	  • may lead to needing a stent
	  • may need to take statins
	
	• both burgers have similar amounts of carbohydrate
	  • good for providing energy
	
	• no information on vitamins / minerals provided for either burger
	
	• meat burgers require animals to be farmed
	  • increase in methane in atmosphere
	  • (methane) contributes to global warming
	
	• meat burgers require animals to be slaughtered
	  • ethical issues
	
	• some people won't eat meat-free burgers
	  • (because) some people don't like the idea of eating fungus
	  • (because) some people prefer the taste of meat
	
	For **Level 2**, comparisons and linked reasons using own knowledge are required.		

Total Question 8		**12**	

4.1.1.2 Animal and plant cells

Answer 40 · Mark scheme

June 2023 | 8461/1F | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.1	a leaf		1	AO2 4.2.1 4.2.3.1

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.2	$\frac{1.1 + 1.1 + 1.4}{3}$ **or** $\frac{3.6}{3}$ 1.2 (grams)	if no answer given on answer lines, allow an answer in **Table 1**	1 1	AO2 4.1.3.2 RPA3

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.3	ring around −32.4 (grams)	table takes precedence allow (−)32.4 (grams) written by question	1	AO3 4.1.3.2 RPA3

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.4	did not include it	allow ignored it	1	AO2 4.1.3.2 RPA3

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.5	control variable		1	AO1 4.1.3.2 RPA3

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.6	time in the salt solution		1	AO3 4.1.3.2 RPA3

4.1.1.2 Animal and plant cells

Answer 40 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.7	osmosis		1	AO2 4.1.3.2 RPA3

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.8	some particles		1	AO1 4.1.3.2 RPA3

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.9	use more concentrations of salt solution		1	AO3 4.1.3.2 RPA3

Total Question 1	10

4.1.1.2 Animal and plant cells

Answer 41 · Mark scheme

June 2024 | 8461/1F | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.1	ionising radiation viruses		1 1	AO1 4.2.2.5 4.2.2.6

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.2	mitosis		1	AO1 4.2.2.7 4.1.2.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.3	grow replicate	must be in this order	1 1	AO1 4.1.2.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.4	40%		1	AO2 4.1.2.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.5	chromosomes are pulled to each end of the cell		1	AO2 4.1.2.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.6	(cell) membrane		1	AO2 4.1.1.2

4.1.1.2 Animal and plant cells

Answer 41 · Mark scheme June 2024 | 8461/1F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.7	$\frac{50}{800}$ 0.0625 (mm) 62.5 (µm)	allow conversion to µm at any stage in the calculation allow correct conversion from student's incorrect calculation	1 1 1	AO2 4.1.1.5

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.8	cells people	must be in this order	1 1	AO1 4.3.1.9

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.9	placebo	allow placebo effect ignore examples and descriptions of placebos	1	AO1 4.3.1.9

Total Question 5	**14**

4.1.1.2 Animal and plant cells

Answer 42 · Mark scheme

June 2025 | 8461/1F | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.1	cytoplasm		1	AO1 4.1.1.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.2	any **one** from: • chromosome(s) • gene(s)	allow DNA / allele allow genetic material ignore genetic information	1	AO1 4.1.1.1 4.1.1.2 4.1.2.1

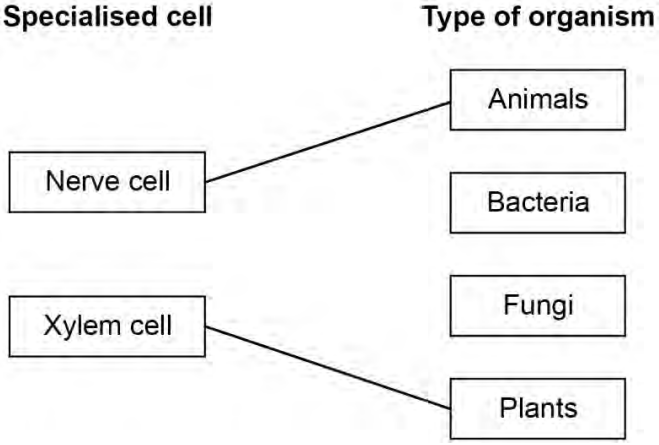
Question	Answers	Extra information	Mark	AO / Spec Ref.
01.3	any **one** from: • (cell) wall • (permanent / large) vacuole • chloroplast	ignore cellulose ignore chlorophyll	1	AO1 4.1.1.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.4	water		1	AO1 4.1.3.3 4.2.3.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.5	any **one** from: • fertilisation • to swim to the egg • to provide chromosomes / DNA for the egg • to carry chromosomes / DNA from the male	allow to fuse / join with an egg allow to penetrate the egg allow to reach the egg ignore swim unqualified allow to provide genetic material / information for the egg	1	AO1 4.1.1.3

4.1.1.2 Animal and plant cells

Answer 42 · Mark scheme

Question	Answers	Mark	AO / Spec Ref.
01.6	 do **not** accept more than one line from a box on the left	1 1	AO1 4.1.1.3 4.2.3.1 4.2.3.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.7	active transport diffusion		1 1	AO1 4.1.3.1 4.1.3.3 4.1.1.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.8			1 1 1	AO2 4.1.3.1 4.1.3.2 4.4.2.1

Substance	Direction of movement of substance		
	ONLY from blood to muscle cells	ONLY from muscle cells to blood	From blood to muscle cells AND from muscle cells to blood
Carbon dioxide		✓	
Oxygen	✓		
Water			✓

do **not** accept more than one tick in any row

Total Question 1	12

Version 1: 0109

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Biology 4411

BLY3F Unit Biology 3

Mark Scheme

2009 examination – January series

4.1.1.2 Animal and plant cells

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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4.1.1.2 Animal and plant cells

MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example:
where consequential marking needs to be considered in a calculation;
or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

4.1.1.2 Animal and plant cells

Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(.....) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

4.1.1.2 Animal and plant cells

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
1(a)(i)	artery		1
1(a)(ii)	capillary		1
1(b)	alveoli		1
	red blood cells		1
	nucleus		1
Total			**5**

4.1.1.2 Animal and plant cells

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
2(a)(i)	energy		1
2(a)(ii)	microorganisms		1
2(b)(i)	25°C		1
2(b)(ii)	pathogens		1
Total			**4**

4.1.1.2 Animal and plant cells

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

<table>
<tr><th>question</th><th>answers</th><th>extra information</th><th>mark</th></tr>
<tr><td>3(a)</td><td>178</td><td>ignore working or lack of working

correct working: 180 – 2 but no answer / wrong answer = 1 mark</td><td>2</td></tr>
<tr><td>3(b)</td><td><table><tr><th>Man A</th><th>Man B</th></tr><tr><td>higher</td><td>lower</td></tr><tr><td>lower</td><td>higher</td></tr><tr><td>lower</td><td>higher</td></tr></table></td><td>all 4 cells correct = 2 marks
2 or 3 cells correct = 1 mark
0 or 1 cells correct = 0 mark</td><td>2</td></tr>
<tr><td>Total</td><td></td><td></td><td>4</td></tr>
</table>

4.1.1.2 Animal and plant cells

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
4(a)	yeast		1
4(b)(i)	**two** sensible suggestions, each linked to correct explanation:	max **4** marks	
	does not release CO		1
	gas is toxic / harms living organisms	allow ethanol <u>only</u> releases CO_2 and H_2O for **1** mark	1
	does not release NO_x / SO_2	do **not** allow more pollution / more gases released	1
	gas(es) cause acid rain / eq / harms organisms		1
	or		
	does not cause acid rain (1)		
	(acid rain) damages building / harms organisms (1)		
	made from crops / not a fossil fuel (1)		
	crops can re-grow / source is renewable / fossil fuels are non-renewable (1)		
4(b)(ii)	any **one** from • releases less energy (per litre) • need to burn more to cover same distance / travel shorter distance • land not being used for food crops / less food available • raises food prices		1
Total			**6**

4.1.1.2 Animal and plant cells

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
5(a)	40–60 hours		1
5(b)(i)	decrease 1st slowly then faster / appropriate detail from the graph eg from 7.8 to 0 / faster after 4-10 h		1 1
5(b)(ii)	oxygen after glucose oxygen less than glucose	extra box ticked cancels **1** mark	1 1
5(b)(iii)	aerobic respiration		1
Total			**6**

4.1.1.2 Animal and plant cells

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
6(a)(i)	kill / destroys (micro)organisms / bacteria / fungi / living things	do **not** allow get rid of microorganisms	1
6(a)(ii)	entered from environment / already in flask **or** insufficient heating to kill all microorganisms		1
6(b)	any **two** from: • heated more thoroughly / for longer / higher temperature • destroyed / killed all microorganisms • sealed better eg flask melted / sealed immediately after heating / no pouring through air • microorganisms unable to enter (from air) / can only enter when neck broken / open		2
6(c)	biogenesis		1
Total			**5**

4.1.1.2 Animal and plant cells

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
7(a)(i)	19 800	for correct answer ignore working or lack of working 165 × 120 but no answer / wrong answer = **1** mark (ignore extras)	2
7(a)(ii)	any **two** from: • for respiration • energy released • prevents anaerobic respiration • prevents build-up of lactic acid	 ignore oxygen debt allow energy produced	2
7(b)	any **two** from: • increased breathing rate • increased depth of breathing **or** deep breathing • dilation of arteries / vasodilation • blood diverted from elsewhere	 } more breathing is max **1** mark ignore increase in heart rate allow heavier breathing do **not** allow harder breathing allow blood vessels dilate do **not** allow veins / capillaries dilate ignore name of organ	2
Total			**6**

4.1.1.2 Animal and plant cells

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
8(a)	transpiration / evaporation / diffusion	ignore osmosis	1
8(b)(i)	D		1
8(b)(ii)	any **two** from: • more / faster diffusion **or** evaporation **or** transpiration • molecules move faster • maintains concentration gradient **or** keeps water concentration low in the air **or** brings in more dry air **or** removes damp air / water		2
Total			**4**

4.1.1.2 Animal and plant cells

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
9(a)	prevents denaturation / change / damage of proteins / enzymes **or** prevents bacteria being killed / destroyed	allow protein is 'destroyed' do **not** allow 'bacteria denatured' **or** 'protein killed'	1
9(b)(i)	any **two** from: • anaerobic respiration • lactic (production) • acid (produced)	do **not** allow 'bacteria are acidic' allow max **1** mark if incorrect named acid	2
9(b)(ii)	any **one** from: • thickens / clots / solidifies (milk) • kills other microorganisms **or** prevents other microbes growing • preserves yoghurt **or** prevents yoghurt going off **or** makes yoghurt last longer **or** keeps it fresh • reference to (improved) flavour	allow reference to germs	1
9(c)	reduce / prevent growth / reproduction of microorganisms **or** to prevent decay **or** to preserve it **or** to keep it fresh **or** to prevent it becoming <u>too</u> sour	allow reference to germs ignore curdling	1
Total			**5**

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AQA

GCSE
BIOLOGY
8461/1F

Paper 1 Foundation Tier

Mark scheme

June 2020

Version: 1.0 Final Mark Scheme

jun2084611F/MS

4.1.1.2 Animal and plant cells

MARK SCHEME – GCSE BIOLOGY – 8461/1F – JUNE 2020

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MARK SCHEME – GCSE BIOLOGY – 8461/1F – JUNE 2020

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement
- the Assessment Objectives, level of demand and specification content that each question is intended to cover.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening and underlining

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.

2.4 Any wording that is underlined is essential for the marking point to be awarded.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution?

[1 mark]

Student	Response	Marks awarded
1	green, 5	0
2	red*, 5	1
3	red*, 8	0

Example 2: Name two planets in the solar system.

[2 marks]

Student	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols/formulae

If a student writes a chemical symbol/formula instead of a required chemical name, full credit can be given if the symbol/formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Marks should be awarded for each stage of the calculation completed correctly, as students are instructed to show their working. Full marks can, however, be given for a correct numerical answer, without any working shown.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward is kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation ecf in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.8 Allow

In the mark scheme additional information, 'allow' is used to indicate creditworthy alternative answers.

3.9 Ignore

Ignore is used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

3.10 Do <u>not</u> accept

Do **not** accept means that this is a wrong answer which, even if the correct answer is given as well, will still mean that the mark is not awarded.

4. Level of response marking instructions

Extended response questions are marked on level of response mark schemes.

- Level of response mark schemes are broken down into levels, each of which has a descriptor.
- The descriptor for the level shows the average performance for the level.
- There are two marks in each level.

Before you apply the mark scheme to a student's answer, read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1: Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer.

When assigning a level you should look at the overall quality of the answer. Do **not** look to penalise small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level.

Use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 2 with a small amount of level 3 material it would be placed in level 2 but be awarded a mark near the top of the level because of the level 3 content.

Step 2: Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this.

The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

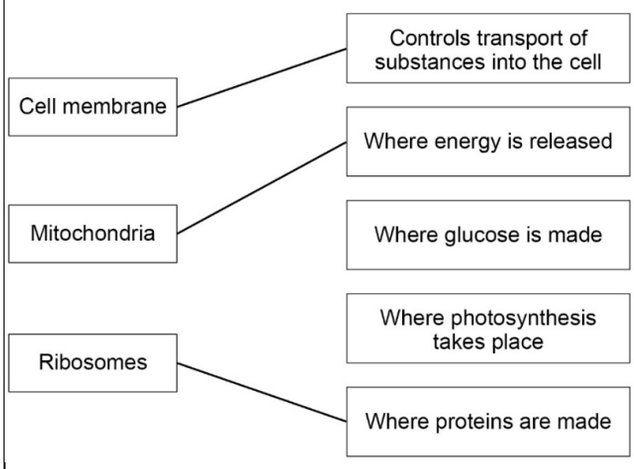
You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do **not** have to cover all of the points mentioned in the indicative content to reach the highest level of the mark scheme.

You should ignore any irrelevant points made. However, full marks can be awarded only if there are no incorrect statements that contradict a correct response.

An answer which contains nothing of relevance to the question must be awarded no marks.

4.1.1.2 Animal and plant cells

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	bacterium		1	AO2 4.1.1.1
01.2	to strengthen the cell		1	AO1 4.1.1.1 4.1.1.2
01.3	chloroplast		1	AO2 4.1.1.2 4.2.3.1
01.4	**Structure** **Function**  additional line from a box on the left negates the mark for that box		3	AO1 4.1.1.2 4.1.3.1
01.5	adjust the focus knob		1	AO3 4.1.1.2 RPA1
01.6	(A =) 15 (mm) (B =) 60 (mm)	allow a tolerance of ± 1mm	1 1	AO2 4.1.1.2 RPA 1
01.7	$\frac{60}{15} = 4(.0)$	allow ecf from question **01.6**	1	AO2 4.1.1.2 RPA 1

4.1.1.2 Animal and plant cells

01.8	$\frac{40}{0.1}$ 400	 do **not** accept if a unit is given	1 1	AO2 4.1.1.5 RPA 1
Total			**12**	

4.1.1.2 Animal and plant cells

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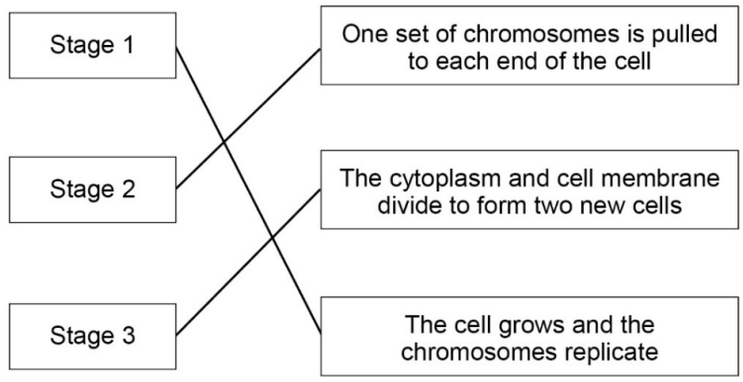
Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	mitosis		1	AO1 4.1.2.2
02.2	all lines correct = **2** marks 1 or 2 lines correct = **1** mark **Stage of cell cycle** / **What happens during that stage**  additional line from a box on the left negates the credit for that box		2	AO1 4.1.2.2
02.3	$\frac{7}{10} \times 100$ 70(%)	allow $\frac{252}{300} \times 100$ allow answer calculated from angle in range 250° to 254° if no other mark awarded, allow 0.7 for **1** mark	1 1	AO2 4.1.2.2
02.4	3		1	AO2 4.1.2.2
02.5	DNA	allow deoxyribonucleic acid	1	AO1 4.1.2.1 4.1.2.2
02.6	a gene		1	AO1 4.1.2.1

4.1.1.2 Animal and plant cells

02.7	(bone marrow) cells differentiate into many / other types of (named) cell (so) will cure diseases where new cells are needed **or** will cure diseases where cells are damaged	allow (bone marrow) cells can become many / other types of (named) cell allow (so) will cure anaemia / leukaemia **or** blood cancer **or** blood disorders allow (so) will cure paralysis / diabetes	1 1	AO1 AO2 4.1.2.3
Total			**10**	

4.1.1.2 Animal and plant cells

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	any **one** from: • bacteria • fungi • protists	allow singular allow names of pathogens e.g. Salmonella ignore virus / germ	1	AO1 4.3.1.1 4.3.1.3 4.3.1.5
03.2	hydrochloric acid is produced by the stomach the skin is a barrier covering the whole body		1 1	AO1 4.2.2.1 4.3.1.6
03.3	white blood cells engulf the microorganisms.		1	AO1 4.2.2.3 4.3.1.6
03.4	weakened fast	in this order only	1 1	AO1 4.3.1.7
03.5	by coughs / sneezes	allow 'by droplets in the air' do **not** accept other means of transmission e.g. touch	1	AO1 4.3.1.1 4.3.1.2
03.6	(from day) 10 (to day) 18	allow (from day) 18 (to day) 10	1	AO2 4.3.1.2
03.7	14 (days)	allow in the range 13 to 15 (days)	1	AO3 4.3.1.2
03.8	any **one** from: • they had been vaccinated • they already had antibodies • they were immune • they had had it before • they did not get any / enough virus from infected child • they did not play (much) with the infected child	 ignore they were resistant ignore they wore a mask unqualified	1	AO3 4.3.1.2 4.3.1.7

4.1.1.2 Animal and plant cells

03.9	antibiotics do not kill viruses	allow antibiotics do not work on viruses allow antibiotics only kill bacteria	1	AO3 4.3.1.8
Total			**11**	

4.1.1.2 Animal and plant cells

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	increased (at first) until 4 minutes **or** 50 breaths per minute (then) stayed constant (from 4 minutes **or** at 50 breaths per minute)		1 1 1	AO2 4.4.2.2
04.2	175 (beats per minute)		1	AO2 4.4.2.2
04.3	140 (beats per minute)		1	AO2 4.4.2.2
04.4	because his rate is lower than the maximum safe rate	allow ecf for incorrect values in question **04.2** and question **04.3**	1	AO3 4.2.2.2 4.4.2.2

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04.5	**Level 3:** Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.	5–6	AO3
	Level 2: Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.	3–4	AO2
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	AO2
	No relevant content	0	

	Indicative content
	
	• heart rate increased
	  ○ to increase blood flowing to muscles / lungs
	  ○ to provide more oxygen (to muscles)
	  ○ to provide more glucose (to muscles)
	  ○ to remove carbon dioxide more quickly (from the muscles / blood)
	  ○ to remove lactic acid more quickly (from the muscles)
	
	• breathing rate increased
	  ○ supplies more oxygen / air to lungs
	  ○ so more oxygen to blood
	  ○ more carbon dioxide removed
	
	• more oxygen to muscles
	  ○ needed for (increased) respiration
	  ○ to release / provide energy
	  ○ for muscle contraction
	
	• anaerobic respiration occurs
	  ○ due to lack of oxygen
	  ○ which causes a build-up of lactic acid
	  ○ oxygen debt
	  ○ muscle fatigue / pain
	
	To reach **Level 3**, there must be reference to heart rate, breathing rate and respiration
			4.2.2.2
			4.2.2.3
			4.4.2.1
			4.4.2.3
			4.4.2.2

Total			**12**

4.1.1.2 Animal and plant cells

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	will stop animals / herbivores eating it	allow it will not be eaten	1	AO3 4.3.3.2
05.2	chemical		1	AO1 4.3.3.2
05.3	thorns / spikes / spines / prickles (to stop animals / herbivores eating it)		1	AO3 4.3.3.2
05.4	for respiration to store as starch		1 1	AO1 4.4.1.3 4.4.2.1
05.5	add Benedict's (solution / reagent to the liquid) boil / heat (if glucose is present the blue) colour changes to yellow / green / orange / brown / (brick)red	 allow any temperature of 65 °C or above	1 1 1	AO1 4.2.2.1 RPA 4
05.6	(nitrate ions are needed) to make proteins / amino acids which are needed for growth / enzymes / new cells	allow to make chlorophyll / DNA / ATP / nucleic acid allow correct process for named molecule in mp1	1 1	AO1 AO2 4.1.3.3 4.4.1.3 4.4.2.3
05.7	in / on the (soil) water	allow through air (spaces) in the soil	1	AO3 4.3.1.1 4.3.1.4
05.8	dosage toxicity		1 1	AO1 4.3.1.9

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05.9	placebos		1	AO1 4.3.1.9
Total			**14**	

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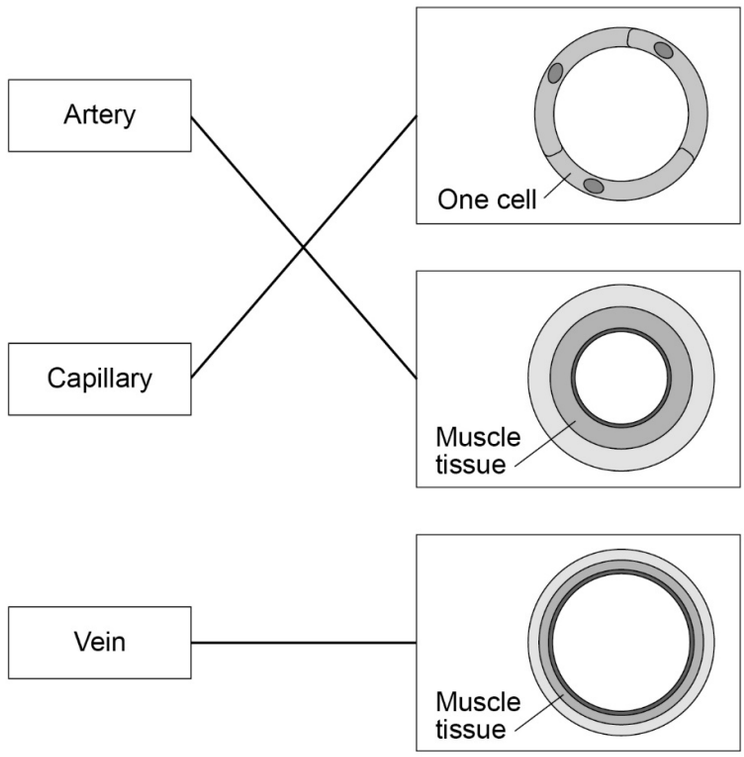
MARK SCHEME – GCSE BIOLOGY – 8461/1F – JUNE 2020

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	all lines correct = **2** marks 1 **or** 2 lines correct = **1** mark **Type of blood vessel** / **Structure of blood vessel**  additional line from a box on the left negates the credit for that box		2	AO2 4.2.2.2

4.1.1.2 Animal and plant cells

06.2	any **one** from: • thick(er) (muscle) walls / tissue (1) to push blood (all) around the body (1) **or** • thick(er) elastic walls / tissue (1) to maintain / withstand high (blood) pressure **or** to retain / regain shape (1) **or** • narrow lumen (1) to maintain high (blood) pressure (1)	allow to withstand high (blood) pressure do **not** accept to pump blood (all) around the body	2	AO1 4.2.2.2
06.3	(A) – white (blood) cell(s) (B) – platelet(s)	allow any named white (blood) cell(s)	1 1	AO2 4.2.2.3
06.4	(no nucleus) more space for haemoglobin / oxygen (has haemoglobin) to bind / carry oxygen	allow to carry more oxygen ignore carries carbon dioxide	1 1	AO3 4.1.1.2 4.1.1.3 4.2.2.3
06.5	plasma		1	AO1 4.2.2.3
06.6	platelets		1	AO3 4.2.2.3

4.1.1.2 Animal and plant cells

06.7	any **one** from: • (continued) bleeding • (more) bruising	allow described allow blood does not clot (at cuts) allow ecf from answer to question **06.6**	1	AO3 4.2.2.3
Total			**11**	

4.1.1.2 Animal and plant cells

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1		allow correct chemical symbols ignore any attempt at balancing equation ignore light / chlorophyll		AO1 4.4.1.1
	before arrow carbon dioxide **and** water	either order	1	
	after arrow glucose	ignore sugar / carbohydrate do **not** accept starch	1	
07.2		ignore description of subsequent parts of the photosynthesis reaction		AO1 4.1.1.2 4.4.1.1
	<u>light</u>	allow sun<u>light</u> ignore sun	1	
	(light) is captured / trapped / absorbed by chlorophyll / chloroplasts	allow (light) is used by chlorophyll / chloroplasts	1	
07.3	$\frac{(18.5 + 19.3 + 19.5)}{3}$ **or** $\frac{57.3}{3}$		1	AO2 4.4.1.2 RPA 6
	19.1 (cm^3/hour)	allow an answer correctly calculated using only two correct values	1	
07.4	a ring around 14.2	allow clear indication of correct result	1	AO3 4.4.1.2 RPA 6

4.1.1.2 Animal and plant cells

07.5	any **one** from: • scale / value was misread • there was air / oxygen in the syringe / measuring cylinder / apparatus • the lamp / light was moved • temperature changed • had different mass / length of pondweed • pondweed had not acclimatised	ignore human error ignore references to counting bubbles or time allow measurement error allow light intensity changed ignore different bulb / lamp unqualified	1	AO3 4.4.1.2 RPA 6
07.6	did not use it in calculation (of mean)		1	AO3 4.4.1.2 RPA 6
07.7	any **one** from: • light (intensity) • carbon dioxide (concentration) • pondweed size / amount • pondweed species	do **not** accept temperature ignore time allow distance / power / colour of lamp / light allow same (piece of) pondweed	1	AO3 4.4.1.2 RPA 6
07.8	enzyme(s) lose the shape of the active site	allow enzyme(s) (start to) denature allow enzyme(s) destroyed / damaged do **not** accept enzyme(s) killed	1	AO2 4.2.2.1

4.1.1.2 Animal and plant cells

07.9	y-axis labelled '(rate of) photosynthesis in cm^3/hour'		1	AO2 4.4.1.2 RPA 6
	suitable scale on y-axis	must take up half or more of grid provided	1	
	all points plotted to within ± ½ small square	allow 3 or 4 correct plots for **1** mark ignore any attempt to plot a point at 20 °C	2	
	correct curved line of best fit	ignore line joined point to point with straight lines ignore extrapolation	1	
Total			**16**	

4.1.1.2 Animal and plant cells

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	movement / spreading out of molecules / particles	allow movement / spreading out of (named) substances / chemicals / gases / liquids ignore reference to membranes / cells	1	AO1 4.1.3.1
	from (an area of) high(er) concentration to (an area of) low(er) concentration	allow down / with the concentration gradient ignore along / across the concentration gradient do **not** accept movement from / to a concentration gradient	1	
08.2	increased carbon dioxide concentration in the air		1	AO2 4.1.3.1 4.2.3.2
	increased number of stomata that are open		1	

4.1.1.2 Animal and plant cells

08.3	**Level 3:** Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.	5–6	AO1 4.1.3.1 4.2.2.2 4.2.2.3
	Level 2: Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.	3–4	
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	
	No relevant content	0	

	Indicative content
	• (many) alveoli
	  • provide a large(r) surface area (**:** volume)
	
	• capillaries are thin
	  or alveoli / capillary walls are thin **or** one cell thick
	  or capillaries are close to the alveoli
	  • which provides short diffusion path (for oxygen / carbon dioxide)
	
	• breathing (mechanism) moves air in and out
	or lungs are ventilated
	  • to bring in (fresh) oxygen
	  • to remove carbon dioxide
	  • to maintain a concentration / diffusion gradient`
	
	• large capillary network (around alveoli)
	or good blood supply
	  • to remove oxygen(ated blood) quickly
	  • to bring carbon dioxide to the lungs quickly
	  • to maintain a concentration / diffusion gradient		

4.1.1.2 Animal and plant cells

08.4	Osmosis	allow diffusion	1	AO1 4.1.3.1 4.2.3.2 4.1.3.2
08.5	active transport (because) energy is needed (to move nitrate ions) from a low(er) concentration (in the soil) to a high(er) concentration (in the root / cell)	 allow (to move nitrate ions) against / up the concentration gradient allow (because) there is a lower concentration (of nitrate ions) in the soil **or** (because) there is a higher concentration (of nitrate ions) in the root / cell ignore reference to amount / number of nitrate ions ignore along / across the concentration gradient do **not** accept if reference to molecules / atoms moving	1 1 1	AO3 AO2 AO2 4.1.1.3 4.2.3.2 4.1.3.3
Total			**14**	

4.1.1.2 Animal and plant cells

Answer 31 · Examiner comments November 2020 | 8461/1F | Original Q1

Question 1 (low demand)

A common misconception seen in **01.4** was that the mitochondria are the site of glucose production. In **01.7**, several students didn't appear to read the question carefully enough, with some subtracting 15 from 60, and some multiplying the values. Students are advised to check their answers carefully, as 60 ÷ 15 = 3 was seen on multiple occasions. In questions where students are asked to calculate magnification, care must be taken not to give (incorrect) units.

Answer 32 · Examiner comments November 2020 | 8461/1F | Original Q2

Question 2 (low & standard demand)

In **02.3**, whilst there is no expectation for students to use a protractor to measure angles, this was occasionally seen. **02.7** was not answered well due to weak use of language, with 4% of students gaining both marks, and 23% gaining one mark. Many students talked generally about new cells replacing the old ones, and some new cells actually 'fixing' or repairing the damaged cells. The idea of stem cells 'adapting' was a common occurrence, as was a repeat of the stem of the question, in relation to stem cells becoming specialised. A few students thought that stem cells were made of plastic or metal (confusing them with replacement heart valves). There was confusion from some students regarding the bone marrow itself being damaged.

Answer 36 · Examiner comments June 2022 | 8461/1F | Original Q2

Question 2 (Low demand)

02.1 It was clear that many students had not previously had experience of viewing cells in different stages of division under a microscope, with just over a quarter of students gaining the mark in this question.

02.2 Students' understanding of mitosis maintaining the chromosome number was poor, with less than 40% of students gaining the mark in this question. The most common incorrect answer was 5, perhaps because students were confusing the process with meiosis, where the chromosome number is halved.

02.3 Many students struggled to select the correct terms to describe the cell cycle in this question, often confusing the word 'contracts' with 'divides'.

02.4 Nearly all students were able to determine the longest part of the cell cycle from **Figure 2**.

02.5 Over three quarters of students were able to calculate that stage **A** in **Figure 2** represented 10%, with the most common incorrect answer being 15%.

02.6 Over 75% of students were able to correctly identify the heart as being part of the circulatory system, with the most common incorrect answer being the respiratory system.

4.1.1.2 Animal and plant cells

Answer 36 · Examiner comments — June 2022 | 8461/1F | Original Q2

02.7 Less than half of students were awarded a mark in this question. Common incorrect answers did not relate to the heart, such as diabetes, and students are reminded of the need to read all questions carefully, to avoid such errors. In addition, some students named parts of the heart rather than medical conditions, perhaps indicating that they had not read the question properly. 'Chronical' heart disease was more commonly seen than anticipated and cancer was often given, which was not creditworthy.

02.8 Over 55% of students gained credit in this question, with the most common answers relating to religious or personal beliefs. Occasionally, risk of infection was seen but rejection was a rarity. This is the type of question where many students had the right idea, but articulated themselves poorly and so did not get the mark. Vague descriptions such as 'they don't agree with it' were not given credit.

Answer 37 · Examiner comments — June 2022 | 8461/1F | Original Q4

Question 4 (Low and standard demand)

04.1 Over 70% of students gained full marks in this question, correctly identifying the parts of the microscope and their functions.

04.2 Nearly 80% of students were able to identify that iodine solution was used to stain the cells.

04.3 Over 90% of students were able to identify that a thin layer of onion allowed light to pass through the cells.

04.4 Over two thirds of students gained full marks in this question. Of those that did not, the most common error was calling a first aider for the plan to minimise the risk.

04.5 Inaccurate measurements of line A-B resulted in some incorrect final lengths of cell Z. However, in the main, most students used the scaffolding provided well and scored well in this question part. Errors in measurement from the line given were largely due to students attempting conversions or calculations on their measurement before completing the answer line. Some responses contained a final solution that was incorrect and would indicate that a calculator was not used in the examination.

04.6 It was common to see only one box ticked in this question, and in **04.7**; students are reminded to read the instructions given in the question carefully. Nearly 50% of students scored full marks and just under 50% scored 1 mark in this question.

04.7 Over 70% of students gained both marks in this question with the most common incorrect answers being to 'use a ruler to draw the cells' and to 'add colour'.

4.1.1.2 Animal and plant cells

Answer 38 · Examiner comments

June 2022 | 8461/1F | Original Q7

Question 7 (Standard demand)

07.1 Students' knowledge of sub-cellular structures was generally well evidenced in this question, however, the common error of referring to energy production / creation in the mitochondria was still seen. In addition, students often referred to energy being released 'for respiration', which is not creditworthy. There was also frequent confusion between cell membranes and cell walls. Just under a third of students gained 2 marks in this question.

07.2 Less than 45% of students were able to correctly reference the function of chloroplasts. Of those that did, most referred to the role in absorbing sunlight, rather than referencing photosynthesis. A few students simply stated that the role was to make the cell or plant green, which was insufficient.

07.3 Only 15% of students were able to name a plant cell that was lacking in chloroplasts, with the majority often giving other types of cell (such as a bacterium), or other sub-cellular structures, as an answer.

07.4 Just under 45% of students were able to correctly identify the independent variable in the investigation.

07.5 It was clear that many students had carried out the required practical on osmosis assessed in this question. However, this did not always translate to an articulate answer regarding blotting. The 45% of students who gained credit in this question were able to articulate the need to remove excess water, or that any extra water would add to the mass recorded, rather than just repeat the stem of the question, as was commonly seen.

07.6 The majority of students were able to use the equation provided to correctly calculate the percentage increase. Some students used an alternative method which would have led to a correct value if they had remembered to subtract 100 from their final answer. Students should therefore be reminded that, in questions where they are given an equation to use, they should use that equation to avoid missing out on vital marks.

07.7 Graph drawing skills still prove difficult for some students, and many make their lives more difficult by using unusual scales or, as often seen in this question, by shifting their x-axis scale. These ideas in themselves are acceptable, but only when the scales remain even and

4.1.1.2 Animal and plant cells

Answer 38 · Examiner comments

June 2022 | 8461/1F | Original Q7

the zero is clearly identified, which often, they were not. While many students were able to plot accurately, a number incorrectly transcribed the reading of (0.3, 0.4) from the table, instead plotting the x-value at 4.0. Many students were unable to draw a correct curve of best fit, either drawing a straight line, or a curve that did not hit all of the points, or that was broken or 'feathered'. Curves of best fit should fall within ½ a small square of all of the points and should be a single, unbroken line. Students should also be reminded that their scale should take up at least 50% of the grid space provided.

07.8 Very few students understood the idea that where the curve crosses the x-axis is where there is no net loss or gain of water in osmosis, and those that did often did not gain credit because of inaccurate readings. Again, readings must be within ½ a small square to be creditworthy. 76% of students scored zero in this question.

07.9 As in previous years, many students continue to make the same error when describing 'concentration' in osmosis explanations. If water concentration is not specified, it is assumed that solute concentration is being described and this often results in an incorrect answer (for example, 'water moves from an area of high concentration to an area of low concentration' is **not** correct). Some students correctly articulate themselves in terms of water concentration, but then go on to contradict themselves with incorrect references to concentration gradients (again, solute is assumed unless water is specifically quoted). A number of students did not make the link to osmosis, instead describing how the salt absorbed the water, dissolved the potato pieces or dried them up. Over two thirds of students scored zero in this question.

4.1.1.2 Animal and plant cells

Answer 39 · Examiner comments

June 2022 | 8461/1F | Original Q8

Question 8 (Standard demand)

08.1 Most students correctly identified ‘vacuole’ or ‘cell wall’ as features found in plant and fungal cells but not in animal cells. The most common error was to give ‘membrane’ or ‘nucleus’, though such answers were fairly rare.

08.2 Over 70% of students were able to identify the fungal disease rose black spot, but a significant number of students gave the incorrect response of gonorrhoea.

08.3 While many students were able to carry out a simple calculation to find the number of times a fungal cell would divide in 24 hours, some students made errors, including stating that one and half hours is 1.3 hours or reversing the numerator and denominator in their calculation. A small but significant proportion of students went further, perhaps deciding that the sum they had completed had not been sufficient to gain the 2 marks or had simply misread the question. These students attempted to determine the total number of cells there would be in 24 hours and frequently calculated 2^{16}.

08.4 Less than 45% of students correctly identified the stomach as the site where protein was digested in the human digestive system. A significant number of students selected the large intestine, indicating a misconception about enzyme action in the digestive system.

4.1.1.2 Animal and plant cells

Answer 39 · Examiner comments

08.5 A significant proportion of students identified Benedict's reagent as the chemical which could be used to test for protein rather than selecting the correct answer of Biuret reagent. Just over 40% of students selected the correct answer.

08.6 The extended response question was well attempted by most students. However, some failed to acknowledge the instruction to 'use your own knowledge', and gave lengthy comparisons about the nutrient content of both burgers, without referring to why this did, or did not, contribute to a balanced diet, thus limiting these students to level 1. Some students did not make effective comparisons, using statements such as 'high in fat' rather than 'higher in fat' or simply repeated figures from the table, therefore, gaining no credit. Some students who did go on to attempt to use their own knowledge gave only vague statements about the burger being 'better for the body' and many confused the significance of each food component, stating that fat is needed for muscle growth and that excess cholesterol causes obesity, for example. Many students understood that protein is needed for muscle development but failed to go on to use the term 'growth' to gain credit. A few students wasted time by giving fairly detailed, (but irrelevant in terms of the question) accounts of enzymic digestion of carbohydrates, fats and proteins in the digestive system. A small number of students offered a valued judgement as to which type of burger might be 'better overall'. However; as the evaluation was taken to be the comparison between the nutritional content of the two burgers, this was not required and so was ignored.

4.1.1.2 Animal and plant cells

Use of statistics

Statistics used in this report may be taken from incomplete processing data. However, this data still gives a true account on how students have performed for each question.

Mark Ranges and Award of Grades

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

4.1.1.2 Animal and plant cells

Answer 40 · Examiner comments

June 2023 | 8461/1F | Original Q1

Question 1 (Low demand)

01.1 Over 70% of students correctly selected the leaf as the largest part of the plant.

01.2 Students were asked to calculate a mean and nearly 75% were able to do this correctly. Errors included multiplication (rather than addition) of the three numbers before dividing by 3, and the selection of tests 1 and 2 only, reflecting the anomaly in the 3rd test for concentrated salt solution. Students are always asked to show their working out and if this was correct, but linked with a final wrong answer, one mark could still be awarded.

01.3 Almost 6% of students did not attempt this question possibly because they did not read the instruction and missed the mark unintentionally. Answers that ambiguously showed a ring around more than one result failed to gain credit.

01.4 Two thirds of students were able to gain the mark here. Some failed to answer the question, however, which specifically asked for what they should do with the result when calculating the mean. The idea of doing another test was clearly inappropriate. Others gave general descriptions of how to work out mean values; others suggested using a figure of 0.7 (the mean of the first 2 tests); others attempted to 'explain' the anomaly instead. None of these answers gained credit.

01.5 A pleasing number of students correctly identified the control variable here, with around 40% of students missing out on the mark.

01.6 Only 20% of students failed to identify the variable that students kept the same as 'Time in the salt solution'.

Answer 40 · Examiner comments

June 2023 | 8461/1F | Original Q1

01.7 Almost 80% of students knew that osmosis was the process described.

01.8 Over 85% of students knew that some particles can pass through a partially permeable membrane.

01.9 Over two thirds of students correctly identified 'use more concentration of salt solution' as a means to improving the investigation.

4.1.1.2 Animal and plant cells

Answer 41 · Examiner comments

June 2024 | 8461/1F | Original Q5

Question 5 (low and standard demand)

05.1 73% of students scored one mark in this question, in comparison to 24% who scored two marks. The most common incorrect response was the selection of monoclonal antibodies rather than viruses. Students should be reminded to check the instructions given at the start of the question, as a minority only ticked one box, rather than two.

05.2 48% of students correctly identified mitosis as being the type of cell division occurring in cancer cells. The majority of incorrect responses were for binary fission.

05.3 69% of students achieved two marks in this question, but it was clear from the number of answer changes that many had deliberated over their responses to this question. Students should be reminded that if they change their minds in any question, they should clearly cross out and rewrite their answers rather than relying on unclear arrows which may possibly be misinterpreted.

05.4 86% of students answered this question correctly.

05.5 66% of students answered this question correctly.

05.6 53% of students gave the correct answer. Many students found identifying the cell membrane from a cell photograph more difficult than from a diagram. The context of cell division led some to give 'egg cell' or 'zygote' and others to suggest the 'nucleus' in their answer. Other incorrect responses included 'cell wall' despite the fact that the picture was of an animal cell.

05.7 In this calculation, which was well answered, nearly two thirds of students achieved full marks. Students were asked to calculate the real width of a cell using figures and an equation given in the question. Most students managed to complete the substitution step correctly although some used the figures the wrong way round. The further requirement to convert the answer obtained in millimetres into micrometres proved more difficult for some.

05.8 Students were often uncertain about the correct choice of words in this question. Many believed that preclinical testing of cancer drugs should be carried out on people and that safety checks should be completed using plants. 28% of students achieved both marks in this question, and 34% achieved one mark.

05.9 54% of students were able to identify a placebo as being a tablet that does not contain an active drug. This question elicited a variety of responses including 'paracetamol', 'aspirin' and 'antibiotics' and no credit was given for descriptions alone. Phonetic spellings of the term were credited and seen frequently.

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4.1.1.2 Animal and plant cells

Answer 42 · Examiner comments

June 2025 | 8461/1F | Original Q1

Question 1 (low demand)

01.1 84% of students were able to identify the cytoplasm of the animal cell.

01.2 Just over two thirds of students were able to identify one structure found in the nucleus, with the most common answer seen being DNA. Students should be reminded that at all levels of demand, reference to 'genetic information' is not creditworthy. A small number of students did not read the question properly, giving the function of the nucleus instead.

01.3 Nearly 80% of students answered correctly with the most common incorrect responses being nucleus, cytoplasm or cell membrane, indicating that students had misread the question.

01.4 Nearly 80% of students answered correctly.

01.5 75% of students answered this question correctly, but this question was an example of where ineffective articulation of language was seen, such as 'to impregnate the egg' or

'to ferment the egg by swimming'. Most students who did not gain credit here gave answers that were incomplete or too vague. The function of a sperm cell is more than the function of its flagellum, and so 'to swim' was insufficient. Other answers which were unable to gain credit included 'for reproduction' or 'to make a baby'. Similarly, reference to DNA / genetic material required the additional qualification of provision 'for the egg' or 'from the male' and, without this, the mark could not be awarded. Some responses referred only to the adaptations of the sperm cell. Although correct, adaptations alone were insufficient. Occasionally, students misread the question and answered in terms of 'stem cells', and confusion between 'egg cell' and 'embryo' was sometimes seen.

01.6 70% of students scored full marks in this question, however, a small number drew more than one line from a box on the left. The most common incorrect answer was a line connecting xylem to fungi. Students should be advised to make very clear any changes they may decide to make in their answers - ambiguous responses gain no credit.

01.7 50% of students scored full marks in this question, with a further 40% scoring one mark.

01.8 Students found this question quite challenging with only 35% scoring full marks, and around a third scoring one mark. Students were required to apply their knowledge in a slightly different context than usual. Gas exchange is, perhaps, most frequently considered in the lungs and this may have led some students to answer in terms of carbon dioxide going out from the blood and oxygen going into it. The idea that water might move anywhere other than from the soil into root hair cells added to the general level of uncertainty. Students were specifically asked to tick the selected boxes, but they occasionally wrote words instead, and these were usually impossible to interpret.