AQA GCSE Biology | 8461

SPECIFICATION POINT 4.7.1.4

Adaptations

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**47**
Available paper years	**2007–2025**

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.

4.7.1.4 Adaptations

Answer 01 · Mark scheme

Question 1

	answers	extra information	mark
(a)	any **two** from: • streamlined / shape reduces friction / long and thin / smooth surface OWTTE • fins / flippers / tail / paddle • structures that push against water	do **not** accept 'arms' or 'legs'	2
(b)(i)	any **two** from: fossil has hind limb / legs / feet fossil has more ribs / bones fossil has teeth fossil has curved spine	it = minke accept any valid comparison	2
(b)(ii)	billion give evidence for		1 1
total			6

4.7.1.4 Adaptations

Answer 02 · Mark scheme March 2007 | BLY1B | Original Q1 | Legacy

One	**A**	black skin	**4**
	B	small ears	**2**
	C	thick fur	**3**
	D	white fur	**1**

Answer 03 · Mark scheme March 2007 | BLY1B | Original Q2 | Legacy

Two	**A**	limb is adapted for burrowing	**3**
	B	limb is adapted for flying	**4**
	C	limb is adapted for gripping branches	**1**
	D	limb is adapted for running	**2**

Answer 04 · Mark scheme June 2007 | BLY1B | Original Q1 | Legacy

Question	Key		
One	**A**	leaves are poisonous	**4**
	B	leaves have prickles	**3**
	C	blue skin with yellow spots	**2**
	D	white colour	**1**

Answer 05 · Mark scheme June 2007 | BLY1F | Original Q1 | Legacy

The full source mark scheme begins on page 61. Follow original question 1 in that document.

Answer 06 · Mark scheme November 2007 | BLY1B | Original Q3 | Legacy

Three	**A**	oily feathers	**2**
	B	large, wide feet	**3**
	C	thick layer of fat under the skin	**1**
	D	streamlined body	**4**

Answer 07 · Mark scheme November 2007 | BLY1B | Original Q8 | Legacy

Eight	**4**	**2**	**3**	**2**

4.7.1.4 Adaptations

Answer 08 · Mark scheme

January 2008 | BLY1F | Original Q2 | Legacy

Question 2

	answers	extra information	mark
(a)	long hind legs / muscular hind legs / bent hind legs	accept powerful hind legs accept back legs act as spring	1
(b)	colour / markings warns predators not to eat it	allow animals learn not to eat them ignore camouflage	1
(c)(i)	any **two** from: • loss of habitat • climate / environment change • pollution	allow new disease allow new predators ignore lack of food **or** eaten	2
(c)(ii)	eg may have chemicals useful to humans	accept duty to keep for future generations allow food chain (effects)	1
total			5

4.7.1.4 Adaptations

Answer 08 · Mark scheme

January 2008 | BLY1F | Original Q2 | Legacy

BLY1F

4.7.1.4 Adaptations

Answer 09 · 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

4.7.1.4 Adaptations

Answer 09 · Mark scheme January 2008 | BLY2F | Original Q1 | Legacy

BLY2F

Answer 10 · Mark scheme January 2009 | BLY1F | Original Q4 | Legacy

question	answers	extra information	mark
4(a)	protection / defence from predators / from being attacked / from being eaten	ignore insulation **or** rolls into a ball ignore camouflage	1 1
4(b)	looks like snake / looks scary deters predators **or** has large eyes to spot predator **or** camouflage **or** warning colouration from predator or prey	allow **two** separate adaptations for **2** marks	1 1
4(c)(i)	natural selection		1
4(c)(ii)	Darwin		1
4(c)(iii)	simple life forms		1
4(d)	believe that God created all organisms **or** humans there from the beginning		1
Total			**8**

4.7.1.4 Adaptations

Answer 10 · Mark scheme January 2009 | BLY1F | Original Q4 | Legacy

Biology BLY1F - AQA GCSE Mark Scheme 2009 January Series

COMPONENT NUMBER: BLY1F

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: January 2009

Answer 11 · Mark scheme March 2009 | BLY1BP | Original Q2 | Legacy

Two	**A**	The camel's stomach can hold 200 litres of water.	**3**
	B	The camel produces little urine and does not sweat.	**1**
	C	Camels store fat in a hump.	**4**
	D	Camels can withstand an increase in body temperature of 9°C without harm.	**2**

Answer 12 · Mark scheme June 2009 | BLY1BP | Original Q1 | Legacy

One	**A**	wide, to stop the bird sinking into the sand	**4**
	B	long, to reach animals buried deep in the sand	**1**
	C	long, to help the bird to see predators approaching	**3**
	D	thick, to provide an insulating layer	**2**

4.7.1.4 Adaptations

Answer 13 · Mark scheme June 2009 | BLY1F | Original Q6 | Legacy

Question 6

question	answers	extra information	mark
6(a)	streamlined / aerodynamic / swept-back / arrow-shaped / dart-shaped wings / tail OR large / long wings	allow pointed / curved wings ignore pointed tail / beak ignore large tail	1
6(b)	no / fewer insects / food (in winter)	allow **too** cold ignore not adapted to cold ignore day length	1
6(c)(i)	any **two** from • feed / hunt at different heights **or** swifts feed higher up • feed / hunt at different times **or** swifts feed at night • arrive / depart at different times		2
6(c)(ii)	nesting sites / territory / habitat	allow homes / space ignore food unqualified allow well qualified food answers eg insects / food near the ground **or** insects / food when it's light **or** insects / food between early May and early August	1
Total			**5**

4.7.1.4 Adaptations

Answer 13 · Mark scheme

June 2009 | BLY1F | Original Q6 | Legacy

BLY1F

Answer 14 · Mark scheme

November 2009 | BLY1BP | Original Q7 | Legacy

Seven	**4**	**4**	**2**	**2**

4.7.1.4 Adaptations

Answer 15 · Mark scheme

Question 2

question	answers	extra information	mark
2(a)	camouflage / less visible	ignore insulation	1
2(b)	insulates / keeps warm	allow keeps out cold ignore camouflage	1
2(c)	prey can't hear it / help catch prey / cannot hear it so isn't scared away	ignore predation on owl	1
2(d)	catching / eating / killing prey / perching / defence		1
Total			**4**

4.7.1.4 Adaptations

Answer 15 · Mark scheme

January 2010 | BLY1F | Original Q2 | Legacy

BLY1F

4.7.1.4 Adaptations

Answer 16 · Mark scheme

January 2010 | BLY3F | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)(i)	villus		1
1(a)(ii)	its outer surface is one cell thick it has a large surface area it has good blood supply	cancel **1** mark for each extra box ticked	1 1 1
1(b)	diffusion		1
Total			**5**

4.7.1.4 Adaptations

Answer 16 · Mark scheme

January 2010 | BLY3F | Original Q1 | Legacy

BLY3F

Answer 17 · Mark scheme

March 2010 | BLY1BP | Original Q1 | Legacy

Question	Key		
One	**A**	Excellent eyesight	**3**
	B	Sharp beak	**4**
	C	Strong powerful claws	**2**
	D	Powerful wings	**1**

Answer 18 · Mark scheme

June 2010 | BLY1BP | Original Q1 | Legacy

No matching mark scheme was available in the supplied archive for this question.

4.7.1.4 Adaptations

Answer 19 · Mark scheme

June 2010 | BLY1F | Original Q2 | Legacy

Question 2

question	answers	extra information	mark
2(a)	digging /getting to insects		1
2(b)	catching insects / food / insects stick to the tongue		1
2(c)	hear insects / predators		1
2(d)	stop soil / dust / insects getting in		1
Total			**4**

4.7.1.4 Adaptations

Answer 19 · Mark scheme

June 2010 | BLY1F | Original Q2 | Legacy

BLY 1F

4.7.1.4 Adaptations

Answer 20 · 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**

4.7.1.4 Adaptations

Answer 20 · Mark scheme June 2010 | BLY2F | Original Q1 | Legacy

BLY2F

Answer 21 · Mark scheme November 2010 | BLY1BP | Original Q5 | Legacy

Five	**A**	the wind blows sand around	**3**
	B	very cold nights	**4**
	C	soft ground	**2**
	D	dry conditions	**1**

	A	**B**	**C**	**D**

Answer 22 · Mark scheme January 2011 | BLY1F | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)	large area	allow thin / large / big / flat / light allow adaptations that cannot be seen eg internal air spaces	1
1(b)	*(*shape means that*)* snow falls off		1
1(c)	protect / stop it being eaten		1
1(d)	stores*/* absorbs water (from other parts of the plant)	ignore absorbs water from soil / air ignore nutrients	1
Total			**4**

BLY1F

Answer 23 · Mark scheme June 2011 | BLY1BP | Original Q1 | Legacy

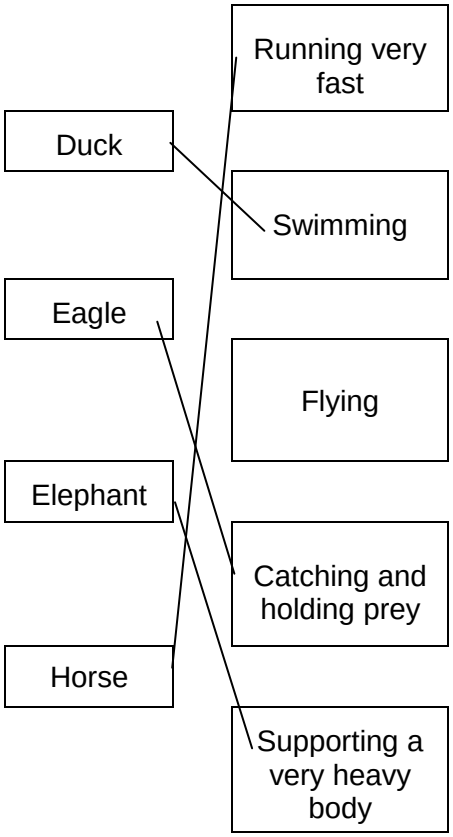
Question	Key		
One	**A**	Thick fur	3
	B	Shaggy tail end	1
	C	Sharp pointed horns	2
	D	Thick muscular neck to move head sideways	4

4.7.1.4 Adaptations

Answer 24 · Mark scheme

June 2011 | BLY1F | Original Q2 | Legacy

Question 2

question	answers	extra information	mark
2		all four correct = **4** marks three correct = **3** marks two correct = **2** marks one correct = **1** mark extra line from a statement cancels the mark	4
Total			**4**

4.7.1.4 Adaptations

Answer 24 · Mark scheme

June 2011 | BLY1F | Original Q2 | Legacy

BLY1F

Answer 25 · Mark scheme

November 2011 | BLY1BP | Original Q1 | Legacy

Question	Key		
One	**A**	Very thick fur	**3**
	B	Very large feet	**2**
	C	Powerful hind legs	**4**
	D	White and grey fur	**1**

4.7.1.4 Adaptations

Answer 26 · Mark scheme

June 2012 | BL1FP | Original Q8 | Legacy

Question 8

question	information		mark
8	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 2, and apply a 'best-fit' approach to the marking.		6
0 marks	**Level 1 (1-2 marks)**	**Level 2 (3-4 marks)**	**Level 3 (5-6 marks)**
No relevant content.	There is at least one example of an adaptation of either an animal **or** a plant. However it may not be clear how the adaptation helps the organism to avoid being eaten.	There is a description of an adaptation of at least one animal **and** at least one plant. It is clear how at least one of these adaptations helps the organism to avoid being eaten.	There are clear and detailed descriptions of a range of adaptations of named animals **and** named plants. It is clear how most of these adaptations help the organisms to avoid being eaten.

examples of clear and detailed biology points made in response:

- **camouflage** – the method of camouflage should be described plus a statement that the predator is less likely to see the prey
- **mimicry / warning colouration** – the method should be described plus a statement that the predator is likely to confuse the prey with e.g. a poisonous organism
- **thorns / prickles / spines / horns** – a statement that these are sharp and are likely to hurt a predator
- **long limbs / streamlining** – a statement that these increase speed and make it more likely that prey will outrun predator
- **bad taste** / **poison** – a statement that predator will find this unpleasant and 'spit out' prey / not attack same prey again
- **large ears / position of eyes** – a statement that predators will be detected earlier so the prey can escape sooner

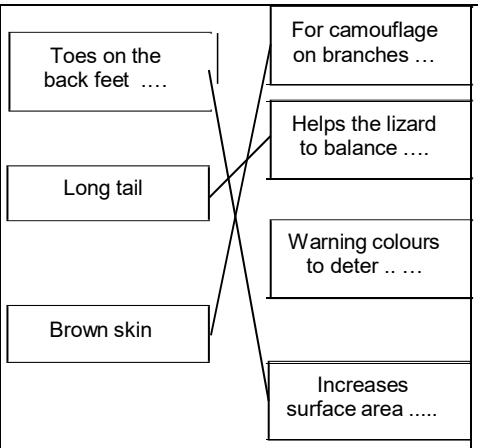
Total		6

UMS Conversion Calculator www.aqa.org.uk/umsconversion

4.7.1.4 Adaptations

Answer 27 · Mark scheme January 2013 | BL1FP | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)		one mark for each line do **not** award mark for an adaptation if lines are drawn from it to more than one advantage	3
1(b)	escape (predators)	accept faster than swimming allow chase prey allow it stops them from drowning	1
1(c)	food territory	deduct **one** mark for each tick in excess of two	1 1
Total			**6**

4.7.1.4 Adaptations

Answer 27 · Mark scheme

January 2013 | BL1FP | Original Q1 | Legacy

BL1FP

4.7.1.4 Adaptations

Answer 28 · Mark scheme

June 2013 | BL1FP | Original Q2 | Legacy

Question 2

question	Answers	extra information	Mark
2(a)	looks like a leaf		1
	so predator less likely to / won't see it	allow 'camouflage' as alternative to either point	1
2(b)(i)	thorns (of acacia tree) hurt (predators)	allow idea that fewer animals / predators live in trees **or** ground living animals can't reach them (in the trees)	1
2(b)(ii)	(giraffe) avoids being bitten by ants	allow ants are poisonous / have unpleasant taste	1
2(c)	looks like / mimics a wasp **or** has warning colouration		1
	so predators think it has a sting		1
Total			**6**

4.7.1.4 Adaptations

Answer 29 · Mark scheme

June 2014 | BL1FP | Original Q9 | Legacy

The full source mark scheme begins on page 72. Follow original question 9 in that document.

4.7.1.4 Adaptations

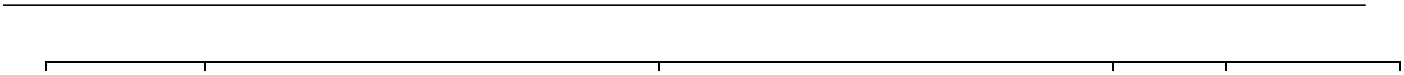
Answer 30 · Mark scheme June 2015 | BL1FP | Original Q6 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)	an extremophile species		1	AO1 1.4.1e
6(b)(i)	smaller ice area (so) less habitat	allow smaller amount of ice allow less ice allow fewer places to live / nest	1 1	AO2 1.4.2a/b
6(b)(ii)	**either** increase as more sea to live in **or** as less competition for food **or** decrease as less space (ice) to lay eggs **or** predators more likely to eat them	there is no mark for increase / decrease alone. The mark is for an appropriate reason linked to increase / decrease if increase / decrease not ringed the mark may be awarded if it is clear in the explanation which is intended	1	AO3 1.4.2a/b
6(c)	Living organisms show long-term changes.		1	AO3 1.4.2d
Total			**5**	

4.7.1.4 Adaptations

Answer 30 · Mark scheme

June 2015 | BL1FP | Original Q6 | Legacy



4.7.1.4 Adaptations

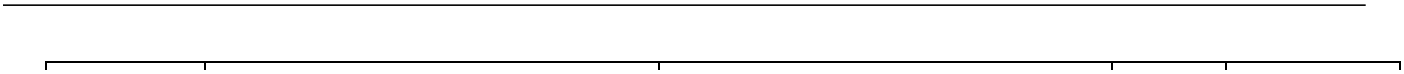
Answer 31 · Mark scheme June 2015 | BL3FP | Original Q1 | Legacy

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

4.7.1.4 Adaptations

Answer 31 · Mark scheme

June 2015 | BL3FP | Original Q1 | Legacy



4.7.1.4 Adaptations

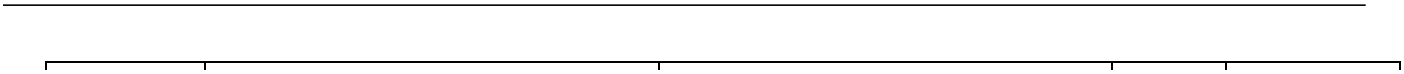
Answer 32 · Mark scheme June 2015 | BL3FP | Original Q5 | Legacy

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

4.7.1.4 Adaptations

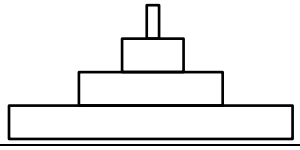
Answer 32 · Mark scheme

June 2015 | BL3FP | Original Q5 | Legacy



4.7.1.4 Adaptations

Answer 33 · Mark scheme June 2016 | BL1FP | Original Q3 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3(a)	any **two** from: • *idea of* absorption of light / energy • transfer to chemical energy • provides food / energy for animals / caterpillar • releases oxygen	allow produce sugars / glucose / starch / carbohydrate / food / biomass	2	AO1 1.5.1a
3(b)			1	AO2 1.5.1b/c
3(c)	15(%)	allow **1** mark for $\frac{3 \times 100}{20}$ with no answer or incorrect answer **or** allow **1** mark for 0.15	2	AO2 1.5.1c
3(d)(i)	any **two** from: • markings look like eyes / face / mouth of much larger animal • looks fierce / scary / dangerous • to frighten blue tit / bird	allow it looks like a snake max 1 if reference to camouflage	2	AO2/AO3 1.4.1d/g
3(d)(ii)	any **two** from: • sharp / long / big claws • sharp / hooked beak • large wings **or** flies quickly • good eyesight	ignore strong ignore strong / big allow streamlined / aerodynamic ignore powerful wings	2	AO2 1.4.1d/f
Total			**9**	

4.7.1.4 Adaptations

Answer 33 · Mark scheme

June 2016 | BL1FP | Original Q3 | Legacy

4.7.1.4 Adaptations

Answer 34 · Mark scheme June 2016 | BL3FP | Original Q7 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7(a)	<u>diffusion</u> <u>active transport</u>	this order only	1 1	AO2 3.1.1a/g
7(b)(i)	concentration (of sugar) in the bag was higher (than in the drink) **or** higher concentration of <u>water</u> outside the bag **or** in the drink / boiling tube (so) <u>water</u> moved in (to the tubing) by osmosis	allow concentration (of sugar) in the drink was lower (than in the bag) allow higher <u>water</u> potential outside the bag **or** lower <u>water</u> potential inside the bag allow <u>water</u> moves down **its** concentration gradient do **not** allow sugar moving allow diffusion (of water) do **not** allow sugar moving by osmosis **or** water moving by active transport	1 1 1 1	AO2 3.1.1.a/b/c
7(b)(ii)	**B**		1	AO3 3.1.1a/b/c
7(b)(iii)	close(st) to the concentration in the bag **or** to 5% (so rate of) diffusion / osmosis is slow	allow small(est) diffusion gradient **or** close(st) to an equilibrium allow (so) less water moves in (to the bag) ignore ref. to sugar	1 1	AO2/3 3.1.1a/b/c
Total			**8**	

4.7.1.4 Adaptations

Answer 34 · Mark scheme

June 2016 | BL3FP | Original Q7 | Legacy



4.7.1.4 Adaptations

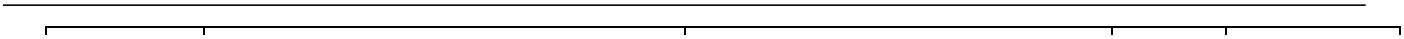
Answer 35 · Mark scheme June 2017 | BL3FP | Original Q5 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)(i)	alveolus / alveoli	allow air sac(s) allow phonetic spelling	1	AO1 3.1.1k
5(a)(ii)	out / outwards down contract **or** shorten decrease / drop / fall	in this order only ignore expand allow to be flat	1 1 1 1	AO1 3.1.2c
5(a)(iii)	capillary / capillaries		1	AO1 3.1.2b 3.2.1g
5(b)(i)	villus / villi / microvilli		1	AO2 3.1.1k/l
5(b)(ii)	any **two** from: • large surface area • thin **or** one cell thick **or** short diffusion pathway • it contains many blood capillaries **or** has an efficient blood supply • (continuous) blood flow maintains the concentration gradient	allow many blood vessels	2	AO2 3.1.1k/l
Total			**9**	

4.7.1.4 Adaptations

Answer 35 · Mark scheme

June 2017 | BL3FP | Original Q5 | Legacy



4.7.1.4 Adaptations

Answer 36 · Mark scheme June 2018 | 8461/1F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	phloem		1	AO2 4.2.3.2
05.2	translocation		1	AO1 4.2.3.2
05.3	either: less (sugars for) respiration (so) less energy released **or** less amino acids made (1) (so) less protein produced **or** less protein synthesis (1) **or** less cellulose made (1) (so) weaker cell walls (1)		 1 1	AO2 4.4.1.3 4.4.2.1
05.4	(aphids) can fly to another plant **or** part of the plant to get (more) food	ignore to fly unqualified allow to find a mate allow idea of less competition for food allow to escape predators do **not** accept escape prey	1 1	AO2 4.3.3.1
05.5	(oil) prevents aphids from attaching to leaf **or** causes aphids to slide off leaf **or** idea that oil may harm / kill the aphid	ignore 'the leaf is slippery' allow oil may be unpleasant to the aphid	1	AO2 4.3.3.2

4.7.1.4 Adaptations

Answer 36 · Mark scheme

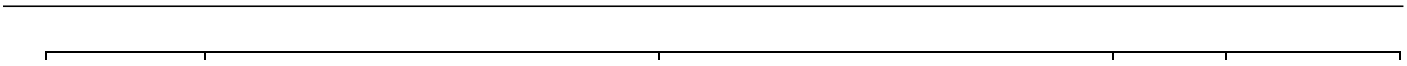
June 2018 | 8461/1F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.6	(plant / stem has) thorns	allow spines / spikes / prickles ignore stings do **not** accept thorns protect (the plant) from predators	1	AO1 4.3.3.2
05.7	C (fungi / spores) blown by / in direction of the wind **or** it's the closest plant (to A)	if any other letter given then no marks for the question allow black spot / disease is blown by / in direction of the wind do **not** accept reference to bacteria / viruses / pollen being blown	1 1	AO3 4.3.1.4 4.3.3.1 AO2 4.3.1.4 4.3.3.1
05.8	any **one** from: • spread rose bushes out more • remove any infected parts of the plant • use a fungicide	allow isolate the infected plant allow idea of barrier around infected plant ignore separate unless qualified allow remove infected plant / A ignore pesticide do **not** accept insecticides / herbicide	1	AO2 4.3.1.4 4.3.3.1
Total			**11**	

4.7.1.4 Adaptations

Answer 36 · Mark scheme

June 2018 | 8461/1F | Original Q5



4.7.1.4 Adaptations

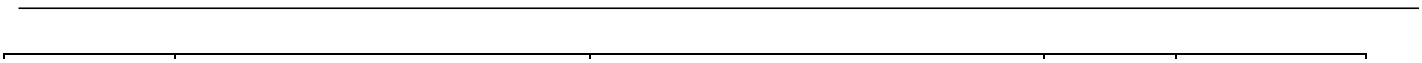
Answer 37 · Mark scheme June 2019 | 8461/1F | Original Q2

02.1	the movement of particles from a high concentration to a low concentration		1	4.1.3.1 AO1
02.2	(gills) have (many) projections (for) large(r) surface / area **or** (gills) are on the outside of the body (1) for good access to water (1)	allow description of projections allow have lots of / five gills	1 1	4.1.3.1 AO2
02.3	differentiation		1	4.1.2.3 AO1
02.4	mitosis	do **not** accept meiosis	1	4.1.2.2 AO1
02.5	hair		1	4.1.2.2 4.1.2.3 AO1
02.6	axolotls are cheap to feed axolotls are easy to breed		1 1	4.1.2.3 AO3
02.7	D		1	4.2.2.2 AO1
02.8	trachea	allow windpipe allow cartilage (ring)	1	4.2.2.2 AO1
02.9	pulmonary artery		1	4.2.2.2 AO1
Total			**11**	

4.7.1.4 Adaptations

Answer 37 · Mark scheme

June 2019 | 8461/1F | Original Q2



4.7.1.4 Adaptations

Answer 38 · Mark scheme June 2019 | 8461/1F | Original Q3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	epidermis palisade mesophyll xylem	 allow palisade / mesophyll	3	4.2.3.2 4.2.3.1 AO1
03.2	guard cells		1	4.2.3.2 4.2.3.1 AO1
03.3	to let carbon dioxide into the leaf		1	4.2.3.2 AO1
03.4	by evaporation		1	4.2.3.2 AO1
03.5	 evidence of correct graph readings (5 and 1) 4 (cm^3)	an answer of 4 (cm^3) scores **2** marks allow in range 4.8 to 5.2 and 0.8 to 1.2 allow correct subtraction from their graph readings allow their calculated value from readings in the range 4.6 to 5.4 and 0.6 to 1.4	 1 1	4.2.3.2 AO2
03.6	plant **A** has more leaves		1	4.2.3.2 AO3
03.7	any **one** from: (the new room was) • windier • warmer • drier / less humid • brighter	answers must be comparative allow sunnier ignore more sun	1	4.2.3.2 AO2

4.7.1.4 Adaptations

Answer 38 · Mark scheme

June 2019 | 8461/1F | Original Q3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.8	any **one** from: • spikes / points / thorns / sharp • poisonous / toxic • brightly coloured berries • leaves are tough / leathery **or** leaves are hard to chew	ignore reference to predators eating holly allow unpleasant taste	1	AO2 4.3.3.2
Total			**11**	

4.7.1.4 Adaptations

Answer 38 · Mark scheme June 2019 | 8461/1F | Original Q3

Question	Answers	Extra information	Mark	AO / Spec. Ref.

Answer 39 · Mark scheme November 2020 | 8461/1F | Original Q5

The full source mark scheme begins on page 87. Follow original question 5 in that document.

Answer 40 · Mark scheme November 2020 | 8461/1F | Original Q6

The full source mark scheme begins on page 87. Follow original question 6 in that document.

Answer 41 · Mark scheme November 2020 | 8461/1F | Original Q8

The full source mark scheme begins on page 87. Follow original question 8 in that document.

4.7.1.4 Adaptations

Answer 42 · Mark scheme November 2020 | 8461/2F | Original Q6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	*Elasmotherium*		1	AO2 4.6.4
06.2	eukaryota		1	AO2 4.6.4
06.3	Carl Woese		1	AO1 4.6.4
06.4	any **one** from: • fighting / competing for mates / food / territory • to kill predators / prey	allow for defence / protection	1	AO2 4.7.1.1 4.7.1.4
6.5	(bones **or** hard tissues) did not decay	allow soft tissues decayed **or** were eaten allow other parts decayed or were eaten allow horn could be damaged / lost in fighting	1	AO1 4.6.3.5
06.6	any **one** from: • compare to other fossils of known age • by the age of the rocks (where fossil was found)	allow compare with the fossil record allow depth underground (where fossil was found) allow (radio)carbon / isotope dating allow DNA analysis	1	AO2 4.6.3.5 4.6.3.6

4.7.1.4 Adaptations

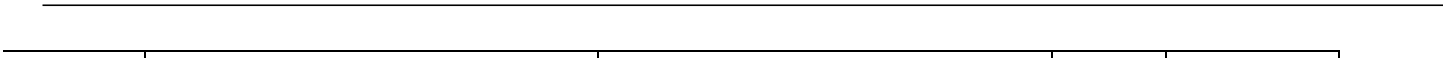
Answer 42 · Mark scheme

06.7 mark with 06.8	0.05 (million years ago)		1	AO2 4.6.3.6
06.8 mark with 06.7	0.2 – 0.05 0.15 150 000 (years)	allow 0.05 × 3 allow ecf from question **06.7** allow 0.15 million (years)	1 1 1	AO2 4.6.3.6
06.9	any **two** from: • drought • ice age / global warming • volcanic activity • asteroid / meteor collision • (new) predators • (new) disease • competition for food • competition for mates • lack of habitat **or** habitat change	ignore pollution allow earthquakes / tsunami allow hunters / poachers / eaten allow named pathogen allow lack of food allow isolation **or** lack of mates if no other marks awarded allow natural disaster **or** climate change **or** catastrophic event for **1** mark	2	AO2 4.6.3.6
Total			**12**	

4.7.1.4 Adaptations

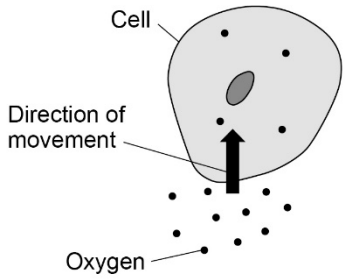
Answer 42 · Mark scheme

November 2020 | 8461/2F | Original Q6



4.7.1.4 Adaptations

Answer 43 · Mark scheme November 2021 | 8461/1F | Original Q1

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

4.7.1.4 Adaptations

Answer 43 · 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**	

4.7.1.4 Adaptations

Answer 43 · Mark scheme

November 2021 | 8461/1F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.7.1.4 Adaptations

Answer 44 · Mark scheme November 2021 | 8461/1F | Original Q3

03.1	(has) spikes / thorns / prickles	allow (has a) tough outer layer	1	AO2 4.3.3.2
03.2	chemical		1	AO1 4.3.3.2
03.3	the plant will not lose as much water		1	AO2 4.2.3.2
03.4	chlorophyll / chloroplasts		1	AO2 4.1.1.2
03.5	to allow it to photosynthesise **or** to make sugar / glucose / carbohydrate / starch		1	AO2 4.4.1.1
03.6	organ		1	AO1 4.2.1
03.7	water / mineral ions	allow named mineral ions allow minerals / ions	1	AO1 4.2.3.1 4.2.3.2
03.8	phloem (tissue)		1	AO1 4.1.1.3 4.2.3.1 4.2.3.2
Total			**8**	

4.7.1.4 Adaptations

Answer 44 · Mark scheme

November 2021 | 8461/1F | Original Q3

Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.7.1.4 Adaptations

Answer 45 · Mark scheme

June 2022 | 8461/1F | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1		in either order		AO1 4.4.1.1
	oxygen	allow O_2	1	
	glucose	allow $C_6H_{12}O_6$	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2		must be in this order		AO1
	xylem		1	4.1.1.3 4.2.3.1
	stomata		1	4.2.3.2
	phloem		1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3	$\frac{310}{254}$		1	AO2 4.2.3.2
	1.22047…		1	
	1.2	allow an answer of 0.82 if numerator and denominator reversed	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.4	each leaf of species **A** has more stomata		1	AO3 4.2.3.2

4.7.1.4 Adaptations

Answer 45 · Mark scheme

June 2022 | 8461/1F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.5	increased temperature		1	AO1 4.2.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.6	C		1	AO2 4.2.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.7	(spines) stop the plant being eaten **or** (spines) prevent animals damaging the plant	 allow any named animal allow to reduce water loss	1	AO2 4.3.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.8	it looks like the hornet (so) animals avoid the risk of being stung	allow animals think it is a hornet allow (so) animals avoid the risk of pain	1 1	AO3 AO2 4.3.3.2

Total Question 5		14

4.7.1.4 Adaptations

Answer 46 · Mark scheme

June 2022 | 8461/1F | Original Q6

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1 View with Table 4	$\frac{3\ 600}{1\ 200}$ 3	if no answer in answer space allow answer in **Table 4** allow 3:1 do **not** accept if a unit is given	1 1	AO2 4.1.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.2	as size increases, (surface area to volume) ratio decreases	allow as one increases, the other decreases allow as size decreases, (surface area to volume) ratio increases	1	AO3 4.1.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.3	any **one** from: • carbon dioxide • glucose / sugar • water • ions / minerals / salts	allow a correct chemical formula allow named ions allow other correct substances eg amino acids / fatty acids / glycerol ignore nutrients / food	1	AO1 4.1.3.2 4.1.3.1

4.7.1.4 Adaptations

Answer 46 · Mark scheme

June 2022 | 8461/1F | Original Q6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.4	any **two** from: • concentration gradient • surface area • thickness of exchange surface • presence of a blood / circulatory system • temperature	allow description allow surface area : volume ratio ignore size unqualified allow thickness of skin	2	AO1 4.1.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.5	gills		1	AO1 4.1.3.1

4.7.1.4 Adaptations

Answer 46 · Mark scheme

June 2022 | 8461/1F | Original Q6

Question	Answers	Mark	AO / Spec. Ref.
06.6	**Level 3:** Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.	5–6	AO2
	Level 2: Relevant points (reasons / causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.	3–4	AO1
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	AO1
	No relevant content	0	4.1.3.1 4.2.2.2
	Indicative content • large number of alveoli • large surface / area • alveolus and blood vessel / capillary are in close proximity • alveoli / capillaries have thin walls **or** alveoli / capillaries have walls that are one cell thick • to reduce diffusion distance • has a good blood supply **or** has a capillary network • to maintain concentration gradient • to remove oxygen quickly **or** to deliver carbon dioxide quickly • (capillary network) increases surface area (for diffusion) • lungs are ventilated **or** lungs continually move air in and out • (ventilation) brings in oxygen **or** removes carbon dioxide • to maintain concentration gradient Types of adaptation of the lungs are required for **Level 3.**		

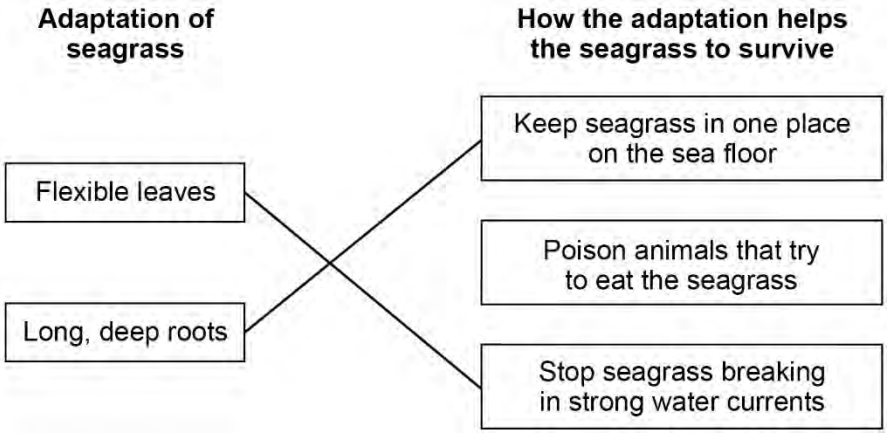
Total Question 6		**13**

4.7.1.4 Adaptations

Answer 47 · Mark scheme

June 2025 | 8461/1F | Original Q5

Question 5

Question	Answers	Mark	AO / Spec Ref.
05.1	 do **not** accept more than one line from a box on the left	1 1	AO2 4.3.3.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.2	lungs	ignore alveoli	1	AO1 4.1.3.1 4.2.2.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.3	gills have a large surface area gills have thin walls		1 1	AO1 4.1.3.1

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.4	$\frac{944}{484}$ 1.9(50413…) 2	 allow correct rounding from incorrect division	1 1 1	AO2 4.4.2.3

4.7.1.4 Adaptations

Answer 47 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.5	*LHS* oxygen	allow formulae	1	AO1 4.4.2.1
	RHS carbon dioxide	in either order	1	
	water		1	

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.6	(stingray is) moving	ignore swimming	1	AO2
	(so) muscles (contract)		1	AO2
	(which) needs energy (from respiration)	do **not** accept energy produced / made / created do **not** accept energy released for respiration	1	AO1 4.4.2.1 4.4.2.3
	OR			
	(when swimming) muscles (1)			
	(muscles) contract (1)			
	(which) needs energy (from respiration) (1)	do **not** accept energy produced / made / created do **not** accept energy released for respiration		

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.7	carbon dioxide		1	AO1 4.4.2.1
	ethanol		1	

Total Question 5	16

4.7.1.4 Adaptations

Version 1.0: 0707

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1F Unit Biology 1

Mark Scheme

2007 examination - June series

4.7.1.4 Adaptations

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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Dr Michael Cresswell, Director General.

4.7.1.4 Adaptations

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.

4.7.1.4 Adaptations

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.

3.8 Unexpected Correct Answers not in the Mark Scheme

The Examiner should use professional judgement to award credit where a candidate has given an unexpected correct answer which is not covered by the mark scheme. The Examiner should consult with the Team Leader to confirm the judgement. The Team Leader should pass this answer on to the Principal Examiner with a view to informing all examiners.

4.7.1.4 Adaptations

BLY1F Question 1

	answers	extra information	mark
(a)(i)	any **two** from: • light • water • space • nutrients / ions / minerals / named • carbon dioxide / CO_2	list principle ignore oxygen / food / sun	2
(ii)	less competition for water **or** more water / nutrients / minerals available	ignore space / light / food	1
(b)	camouflage / same shape as leaf / looks like a leaf	allow ‘blends in’ ignore colour	1
total			4

4.7.1.4 Adaptations

BLY1F Question 2

	answers	extra information	mark
(a)	any **three** from: • water • ions / minerals / salts • temperature • blood sugar • heart rate • blood pressure	 allow breathing / oxygen / carbon dioxide allow sodium / chloride, other ions neutral allow heat ignore urea	3
(b)	contraceptive drug fertility drug		1 1
(c)(i)	eg nicotine, alcohol, cocaine, heroin, painkillers, tranquilisers, LSD	allow cannabis / weed or other alternative names allow tobacco ignore smoking / ecstasy	1
(ii)	alters body chemistry **or** craving / needing / dependence withdrawal symptoms on stopping	allow psychological dependence allow withdrawal described allow ‘feel ill without it’	1 1
total			8

4.7.1.4 Adaptations

BLY1F Question 3

	answers	extra information	mark
	joining		1
	sexual		1
	identical		1
	asexual		1
	clones		1
total			5

BLY1F Question 4

	answers	extra information	mark
(a)	7.8		1
(b)	14 / 13.6	allow answer 13 without working for **1** mark 7500 ÷ 550 gains **1** mark	2
(c)	produces / increases blood cholesterol	ignore obesity	1
	affects heart **or** affects blood vessels **or** affects blood pressure	 accept clogs blood vessels	1
(d)	(increases) blood pressure	ignore references to heart / blood vessels	1
total			6

4.7.1.4 Adaptations

BLY1F Question 5

	answers	extra information	mark
(a)	fossils / teeth / bones / skeleton / foot prints	allow cave drawings do **not** accept scientists have seen them	1
(b)	only (some) bones remain / soft parts have decayed	accept 'no-one has ever seen one' allow no photos, no pictures, no drawings	1
(c)	any **two** from: • hunted by human • (new) predator • (new) competitor • (new) disease • environment changed / named environmental change • prey extinct / loss of food supply	 allow more predators allow natural disaster ignore not enough food	2
total			4

4.7.1.4 Adaptations

BLY1F Question 6

	answers	extra information	mark
(a)(i)	56	accept 54 – 58	1
(ii)	increased		1
	reasonable qualification eg slowly then more quickly **or** to 174 / 176 **or** by 138 / 140		1
(b)	any **two** from: • no immunity **or** antibodies ineffective • no vaccines **or** humans not immunised • idea of large scale contact **or** large scale travel	 accept no resistance do **not** accept passed on ignore no cure	2
total			5

4.7.1.4 Adaptations

BLY1F Question 7

	answers	extra information	mark
(a)	scientists figures based on research / calculations / data **or** scientists sample whole area	ignore reasons based on bias	1
	fishermen based on impression / hearsay / experience **or** fishermen fish in well-stocked / limited areas	scientists sample a wider area = **2** marks fishermen only fish in well-stocked areas = **2** marks if no marks gained fishermens' opinion **and** scientists' opinion gains **1** mark	1
(b)	any **two** from: • economic considerations • political impact • pressure groups **or** fears of extinction	eg fear for jobs, profits, big demand for cod eg allow EU / government decide or laws will be passed	2
total			4

4.7.1.4 Adaptations

BLY1F Question 8

	answers	extra information	mark
(a)	any **two** from: • area of bed sampled • sampling time • size of net • kicking action • net position	control variables from information given	2
(b)	any **two** from: • some animals not dislodged • some animals missed / through / escaped net • invertebrates difficult to identify • invertebrates from outside area	must be ideas related to a sample ignore reliability etc	2
(c)	10 to 99 **or** 10 – 99 **or** 99 to 10 **or** 99 – 10		1
(d)	any **two** from: • increased / goes up • 0 at sample 4 • to (more than) 100	allow increase implied from all data described	2
(e)	mayfly because not found downstream of point where sewage enters stream **or** only in the unpolluted water		1 1
total			9

4.7.1.4 Adaptations

AQA Qualifications

GCSE

SCIENCE A / BIOLOGY

BL1FP
Mark scheme

4405 / 4401
June 2014

Version: 1.0 Final

4.7.1.4 Adaptations

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4.7.1.4 Adaptations

Information to Examiners

1. General

The mark scheme for each question shows:

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- 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 Assessment Objectives 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

4.7.1.4 Adaptations

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

Full marks can be given for a correct numerical answer, 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 or by each stage of a longer calculation.

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 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.

3.8 Ignore / Insufficient / Do <u>not</u> allow

Ignore or insufficient are 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.

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

4.7.1.4 Adaptations

Quality of Written Communication and levels marking

In Question 9 students are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Students will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

4.7.1.4 Adaptations

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	

4.7.1.4 Adaptations

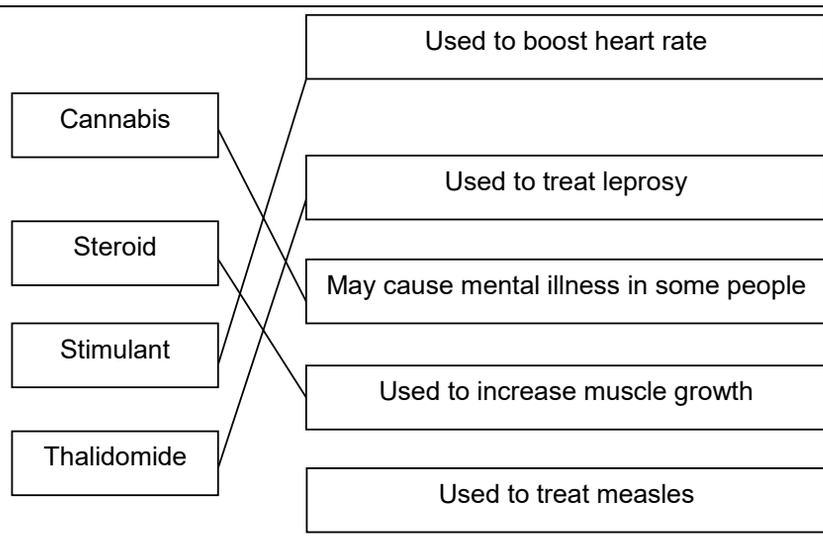
Question	Answers	Extra information	Mark	AO / spec ref.
2(a)(i)	in the direction of the force of gravity		1	AO2 1.2.3a
2(a)(ii)	against the force of gravity		1	AO2 1.2.3a
2(b)(i)	diagram completed to show stem bending / leaning towards the window	the bend / lean can be at / from any point above pot level ignore any leaves	1	AO2 1.2.3a
2(b)(ii)	more light (for leaves) more photosynthesis / biomass / glucose	ignore heat ref to 'more' needed once only, eg 'more light for photosynthesis' = 2 marks if no other marks given allow 1 mark for 'to get light for photosynthesis'	1 1	AO1/ AO2 1.4.1a, b
Total			5	

4.7.1.4 Adaptations

MARK SCHEME – GCSE Science A / Biology – BL1FP – JUNE 2014

Question	Answers	Extra information	Mark	AO / spec. ref
3(a)	(Type 2) diabetes / heart disease / deficiency disease / named	allow a relevant health problem ignore obesity **or** over / under weight / anorexia	1	AO1 1.1.1a
3(b)(i)	provides more (energy / sugar) than is used	idea of sugar being high in / having a lot of energy eg contains a lot of calories allow it is turned to fat **or** stored (as fat)	1	AO2 1.1.1a, b
3(b)(ii)	fat		1	AO1 1.1.1a
3(c)(i)	C		1	AO3 1.1.1
3(c)(ii)	no health problems	allow as others (may) have (possible) health problems ignore reference to sweetness	1	AO3 1.1.1
3(c)(iii)	idea of informed choice	eg in case you have health problems / allergies allow legal requirement ignore diabetes	1	AO3 1.1.1
Total			6	

4.7.1.4 Adaptations

Question	Answers	Extra information	Mark	AO / spec ref.
4(a)	 extra line from any drug cancels that mark		4	AO1 1.3.1d,f,i
4(b)(i)	any **one** from: • (live) animals • cells • tissues	accept named examples, eg mice ignore people / volunteers do **not** allow plants	1	AO1 1.3.1b
4(b)(ii)	to check that the drug works to find the best dose to use		1 1	AO1 1.3.1b
4(b)(iii)	only scientists at the drug company		1	AO2 1.3.1b
4(c)(i)	420		1	AO2 1.3.1
4(c)(ii)	statin(s)		1	AO3 1.3.1
4(c)(iii)	any **one** from: • side effects • other medication • other (medical) conditions	allow cost allow patient choice allow family history **or** age	1	AO3 1.3.1
Total			**11**	

4.7.1.4 Adaptations

Question	Answers	Extra information	Mark	AO / spec ref.
5(a)(i)	gamete(s)	ignore reproductive cells	1	AO1 1.7.2a
5(a)(ii)	womb / uterus	allow phonetic spellings	1	AO1 1.7.2c
5(b)(i)	are formed from the same original embryo		1	AO2 1.7.2c
5(b)(ii)	embryo transplantation		1	AO1 1.7.2c
5(b)(iii)	any **one** from: • (calves will have some) genes / DNA from bull / sperm • idea that sexual reproduction produces variation	allow not all genes from the cow allow may be male allow idea that gene for low fat milk may not be passed on	1	AO2 1.7.2a
Total			**5**	

4.7.1.4 Adaptations

MARK SCHEME – GCSE Science A / Biology – BL1FP – JUNE 2014

Question	Answers	Extra information	Mark	AO / spec ref.
6(a)(i)	(volume) increases (with time)	ignore numbers	1	AO2 1.8.1
6(a)(ii)	there is more evidence / specimens / results (for Homo sapiens)	allow examples of this, eg more / better fossils allow converse if clearly referring to Australopithecus ignore reference to being 'more recent'	1	AO3 1.8.1
6(b)	2.5 – 3.15 (million years ago)	accept any number in range	1	AO3 1.8.1
6(c)(i)	Darwin		1	AO1 1.8.1a
6(c)(ii)	any **one** from: • they believed in other theories • insufficient evidence • no proof • genes / mechanism of inheritance not known / discovered	 allow they believe that God made all life ignore 'no evidence' allow not enough proof	1	AO1 1.8.1b
Total			**5**	

4.7.1.4 Adaptations

Question	Answers	Extra information	Mark	AO / spec ref.
7(a)	sensory neurone		1	AO1 1.2.1e
7(b)(i)	synapse		1	AO1 1.2.1e
7(b)(ii)	a chemical		1	AO1 1.2.1e
7(c)	(What happens to the muscle) any **one** from: • contraction / contracts • gets shorter (How this helps the body) idea of protection for body (from damage / pain)	mark both parts of the question together ignore relaxation / relaxes / tenses eg moves finger / arm away (from pin / stimulus / source of pain)	1 1	AO1 / AO2 1.2.1e
Total			**5**	

4.7.1.4 Adaptations

MARK SCHEME – GCSE Science A / Biology – BL1FP – JUNE 2014

Question	Answers	Extra information	Mark	AO / spec ref.
8(a)	3-layered triangular pyramid	as blocks or layered triangle, ignore (small) gaps between layers	1	AO2 1.5.1b
	(pyramid) labelled in food chain order	all three labels are required for **2** marks the pyramid must be fully correct	1	
8(b)(i)	C		1	AO3 1.5.1c
8(b)(ii)	shortest **or** fewest stages / transfers / (trophic) levels	allow only if (b)(i) is C or blank	1	AO1 / AO2 1.5.1c
	less losses in waste / faeces / urine / CO_2 / excretion	allow smaller amount uneaten	1	
	less loss in respiration / heat / movement	allow less lost keeping warm do **not** allow energy for respiration do **not** allow respiration makes energy allow less loss (of biomass / energy) **or** less transfer (of biomass / energy) to surroundings if neither 2nd nor 3rd point given, for **1** mark	1	
Total			**6**	

Question	Answers	Extra information	Mark	AO / spec ref.
9	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5 and apply a 'best-fit' approach to the marking.		6	AO1 1.4.1d,f

0 marks	**Level 1 (1-2 marks)**	**Level 2 (3-4 marks)**	**Level 3 (5-6 marks)**
No relevant content.	At least **one** way in which animals **and / or** plants are adapted to survive.	A description of ways in which animals **and / or** plants are adapted **and** an attempt to link at least **one** adaptation to how it increases the chance of survival.	A description of ways in which animals **and** plants are adapted **and** a description of how at least **one** adaptation increases the chance of survival.

examples of biology points made in the response:

(animals)
- (A) change / decrease in surface area / example
  - (decrease in surface area which) reduces area from which sweat / water may be lost
- (A) hump with fat / fat stores
  - (fat in hump) to convert to water (via respiration)
- (A) long eyelashes
  - (long eyelashes) to keep (wind-blown) dust out of eyes
- (A) nocturnal / 'keep out of the sun'
  - reduce sweat loss (in heat of the day)

(plants)
- (A) decrease in surface area
- (A) leaves are spikes
  - (reduced area / leaves are spikes) reduces water loss / transpiration / evaporation
- (A) long / wide spread / extensive roots
  - (long / wide spread /extensive roots) to absorb (more) water
- (A) fleshy / thick stem
  - (fleshy / thick stem) to store water

extra information

allow adaptations of specific animals to living in specified dry conditions, eg a desert
- (A) change / increase in surface area / example
  - (increase in surface area which) increases area heat may be lost from (by radiation)
- (A) changes to thickness of insulating coat
  - (thicker coat on upper surface) increases insulation from sun's heat
- (A) thin (layer) / reduced amount of body fat
  - (reduced amount of body fat which) reduces insulating layer
- (A) wide feet
  - (wide feet) to reduce pressure / spread weight / prevent sinking

allow adaptations of specific plants to living in specified dry conditions, eg a desert
- (A) thick wax
  - (thick wax) to reduce evaporation / water loss / transpiration
- (A) few(er) stomata
  - (few stomata) to reduce evaporation / water loss / transpiration

Total			**6**	

4.7.1.4 Adaptations

Question	Answers	Extra information	Mark	AO / spec ref.
10(a)	microorganisms	allow microbes / bacteria / fungi / decomposers	1	AO1 / AO2 1.6.1b
	(microorganisms) respire	do **not** allow dead plants respire	1	
	(respiration / decay / microorganisms) releases (thermal) energy / 'heat'	ignore produce 'heat' do **not** allow produce energy do **not** allow dead plants release 'heat'	1	
10(b)(i)	any **three** from: • (opening) allows oxygen in		3	AO1 / AO2 / AO3 1.6.1b, c, 1.6.2
	• microorganisms / eggs need oxygen	allow air for oxygen		
	• oxygen needed for respiration			
	• (opening) allows release of carbon dioxide (from microorganisms / respiration / eggs)	allow gaseous exchange (1 mark) of / for microorganisms / eggs (1 mark) if none of first four points given		
	• (opening) allows energy / 'heat' to escape • (closing) retains energy / 'heat' if too cool / at night	if no mark awarded for either of these points allow 1 mark for vents open in the day to prevent overheating **and** close at night to prevent it getting too cold		
	• (closing) retains moisture	allow (opening) releases moisture		
10(b)(ii)	any **one** from: • maintains sex balance	e.g. equal / best / correct numbers of male and female	1	AO3 1.6.1
	• (survival of species depends on there being) males and females in population	allow so the offspring are not all the same sex		
Total			**7**	

4.7.1.4 Adaptations

AQA

GCSE
BIOLOGY
8461/1F

Paper 1 Foundation Tier

Mark scheme

June 2020

Version: 1.0 Final Mark Scheme

jun2084611F/MS

4.7.1.4 Adaptations

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

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' 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.

Further copies of this mark scheme are available from aqa.org.uk

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4.7.1.4 Adaptations

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.

4.7.1.4 Adaptations

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.

4.7.1.4 Adaptations

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.

4.7.1.4 Adaptations

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.

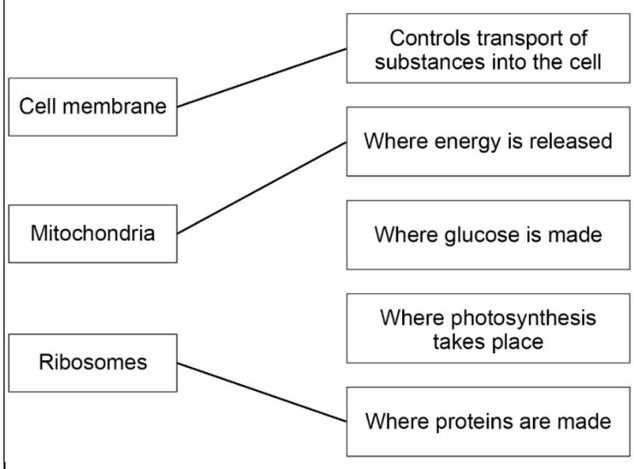
You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

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.

4.7.1.4 Adaptations

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

4.7.1.4 Adaptations

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**	

4.7.1.4 Adaptations

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** Stage 1 → The cell grows and the chromosomes replicate Stage 2 → One set of chromosomes is pulled to each end of the cell Stage 3 → The cytoplasm and cell membrane divide to form two new cells 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

4.7.1.4 Adaptations

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**	

4.7.1.4 Adaptations

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

4.7.1.4 Adaptations

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**	

4.7.1.4 Adaptations

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

4.7.1.4 Adaptations

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**

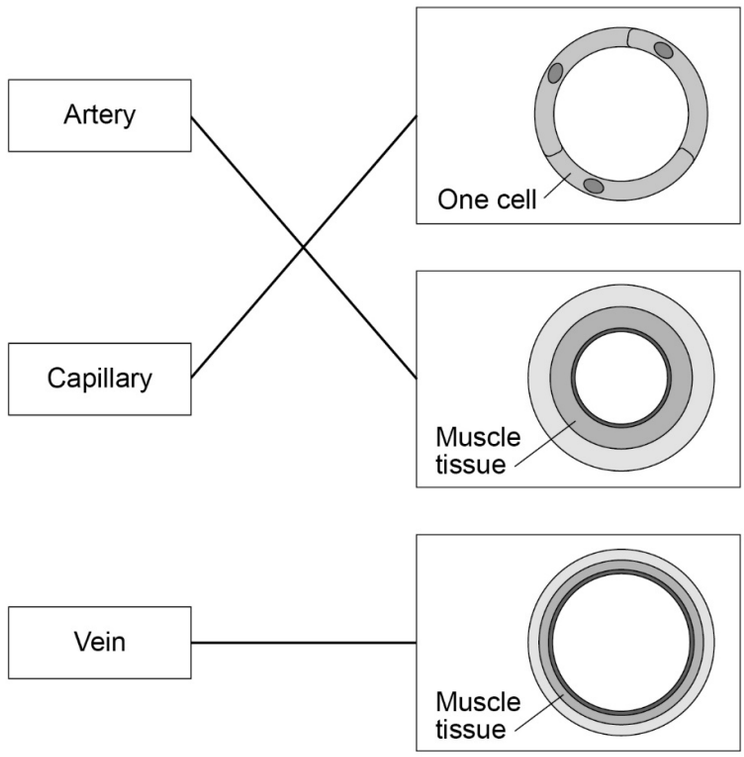
4.7.1.4 Adaptations

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

4.7.1.4 Adaptations

05.9	placebos		1	AO1 4.3.1.9
Total			**14**	

4.7.1.4 Adaptations

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

4.7.1.4 Adaptations

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

4.7.1.4 Adaptations

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**	

4.7.1.4 Adaptations

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
	light	allow sunlight 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

4.7.1.4 Adaptations

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

4.7.1.4 Adaptations

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**	

4.7.1.4 Adaptations

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	

4.7.1.4 Adaptations

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		

4.7.1.4 Adaptations

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**	

4.7.1.4 Adaptations

Answer 39 · Examiner comments November 2020 | 8461/1F | Original Q5

Question 5 (low & standard demand)

As in previous years, many students missed heating the Benedict's solution in **05.5** and several confused this test with the test for starch. 25% of students scored at least one mark in this question. It was clear that a large proportion of students were not familiar with this experiment, and in these cases, students suggested splitting open the cells and looking for the glucose using a microscope which has not been seen in previous years. 22% of students gave no response to **05.5**.

Answer 40 · Examiner comments November 2020 | 8461/1F | Original Q6

Question 6 (low & standard demand)

A lack of specificity in use of scientific language meant that few students were able to accurately articulate their ideas in **06.2**, resulting in a high level of discrimination between lower- and higher-attaining students. Many students referenced thick cell walls, lots of muscle in cells, as well as arteries having a large surface area.

06.3 highlighted that some students may not have been exposed to alternative images of blood cells, and many thought that the blood cells were actually cell parts, such as nuclei and cytoplasm. Half of the students gained marks in this question.

In **06.7** several students were able to make the link between platelets and blood clotting, but many incorrectly stated that the blood would clot too much as a result of reduced platelets.

4.7.1.4 Adaptations

Answer 41 · Examiner comments

November 2020 | 8461/1F | Original Q8

Question 8 (standard demand)

The use of the term concentration gradient was confused by many students throughout this question. Movement 'along/across' a concentration gradient gives no clear indication of direction and requires further qualification; movement to/from a high/low concentration 'gradient' is incorrect. Some students described cells moving, instead of ions or particles. Some students had simply not learnt the definition.

Students should take care when reading the command word for each question. **08.3** asked for explanation(s), and without this, Level 2 and Level 3 could not be accessed. Very few students showed any detailed knowledge of the adaptations of the lungs; few could name the alveoli and the term 'bronchioli' as a hybrid of bronchioles and alveoli was commonly seen. Some students also stated that the alveoli contained villi. It is important to note that the alveoli having 'moist linings' is not a creditworthy answer to a question about adaptations for gas exchange. The gas exchange surfaces are moist **due** to diffusion, and therefore, a moist surface is a feature of the lungs but not a feature that maximises the diffusion of gases.

Osmosis and active transport were often confused in **08.5** and whilst nearly half of students were able to name active transport as the method of transport in **08.6**, less than 20% were able to go on to explain the process in the context of the question.

4.7.1.4 Adaptations

Answer 41 · Examiner comments

Concluding Remarks

Generally, performance on this paper was broadly comparable to previous years. Students generally scored well on simple recall of knowledge questions (AO1) and the topics of cell structure and immunity were well answered. Students were less confident in their knowledge and understanding of stem cells and differentiation and many could not apply their knowledge to new situations effectively (AO2).

Many students lacked the ability to articulate their thoughts logically and clearly on paper and a lack of comparative answers was common. As in previous years, details of the Benedict's test for sugar had been poorly learnt and students continue to struggle to understand how protein is used in living organisms. Students' understanding of command words was weak. Many 'explain' questions throughout the paper were answered in descriptive terms and students are advised to check the command word for each question before putting pen to paper.

4.7.1.4 Adaptations

Answer 41 · Examiner comments

Mark Ranges and Award of Grades

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

4.7.1.4 Adaptations

Answer 42 · Examiner comments November 2020 | 8461/2F | Original Q6

Question 6 (low & standard demand)

This question was about classification, the fossil record and extinction. In **06.5** students often did not make themselves clear when describing the decomposition of various tissues. 'It' or 'they' decomposed were insufficient as the subject of the question was bones. A number of students described the fossils themselves as decomposing. Students did not find **06.6** easy, often just rephrasing the question. A small number suggested the use of carbon dating but the most common correct answers referred to depth or age of the rocks in which the fossils were found as a means of dating them.

06.7 was not well done. Many students were unable to determine the correct time period from the scale on the graph. Some of those who got close to the answer did not realise that the answer line was already primed with 'million' and left their answer as '50 000 million' million. Very few students were able to work out the required answer to **06.8**, despite the mark scheme making allowance for errors from the previous question being carried forward. Many showed numbers in their working which had no evidence of their origin from the graph.

Answer 45 · Examiner comments June 2022 | 8461/1F | Original Q5

Question 5 (Low and standard demand)

05.1 Over 90% of students were able to recall the equation for photosynthesis, however, there were still some unusual spellings of oxygen seen, despite the word being provided.

05.2 The structure of plant parts is still a difficult concept for many students, particularly at Foundation tier. Less than 20% of students gained full marks in this question, with over 35% gaining no marks at all.

05.3 For those students who performed the correct calculation in this question, many were not credited with MP3 as they mistakenly thought that 1.22 (2 decimal places) was the same as 2 significant figures. Other common errors included reversing the numerator and denominator in the calculation and simply subtracting the two values from the table, rather than dividing them.

05.4 Nearly 60% of students answered correctly.

4.7.1.4 Adaptations

Answer 45 · Examiner comments

June 2022 | 8461/1F | Original Q5

05.6 Only 45% of students were able to identify that increased temperature would increase the rate of transpiration. The most common incorrect answer was increased humidity, a concept that many students continue to find difficult.

05.7 Nearly 85% of students correctly identified plant **C** as most likely to live in a desert.

05.8 Over 60% of students were able to describe that the spines on the gorse plant would stop the plant from being eaten, but there were many vague and uncreditworthy answers seen also, such as ‘they defend / protect the plant’ or ‘they warn things off’. Answers relating to water loss were rarely, if ever, seen.

05.9 When faced with the context of mimicry in this question, many students struggled, often coming up with ideas about the similarity of the colours of both insects, that the hornet moth possessed poisons / venom / toxins, carried bacteria or diseases or that they possessed an internal 'stinger' which would harm predators. None of these ideas could be ascertained from the figure provided and therefore were not creditworthy. Over 50% of students scored zero marks on this question.

4.7.1.4 Adaptations

Answer 46 · Examiner comments — June 2022 | 8461/1F | Original Q6

Question 6 (Low and standard demand)

06.1 77% of students gained full marks in this question.

06.2 Nearly 60% of students scored zero marks on this question. Many confused the idea of surface area to volume ratio with surface area or volume, therefore making their explanations contradictory.

06.3 Over 70% of students were able to name one substance that enters cells by diffusion with the most popular answers being carbon dioxide and water. Nitrogen was occasionally seen but was not credited.

06.4 Less than 10% of students gained both marks in this question and lots of responses about size were seen, which was not enough to gain the mark. Some students wrote about the concentration of oxygen in the water but failed to go on to mention the concentration gradient. The most common correct responses were temperature and surface area.

06.5 Nearly 70% of students were able to name the gills as the was exchange organs in fish. Common incorrect answers included lungs, heart, fins and scales.

Answer 46 · Examiner comments — June 2022 | 8461/1F | Original Q6

06.7 Over 40% of students scored zero marks in this question and the most common score after zero was one mark. In this levelled response question, students were asked to explain how the breathing system is adapted to maximise the rate of gas exchange. Logical linking was required to reach both levels 2 and 3 of the mark scheme, and this is where most students fell down. A minority of students were able to describe some feature of the lungs, but many failed to even state that the lungs have a large surface area. Very few students were able to make the link between gas exchange and diffusion. Many students wrote lengthy responses about the journey of oxygen or the mechanism of breathing, neither of which were asked about in the question.

4.7.1.4 Adaptations

Answer 47 · Examiner comments

June 2025 | 8461/1F | Original Q5

Question 5 (low and standard demand)

05.1 77% of students achieved 2 marks in this question.

05.2 71% of students were able to identify the lungs as the site of gas exchange in humans. A wide range of other suggested organs was also seen, for which credit was not awarded. Students should be reminded of the list rule as stated in section 3.1 at the start of the mark scheme; an answer of 'lungs and heart' would score no credit in this question.

05.3 65% of students scored full marks in this question, with a further 30% achieving one mark.

05.4 Just over half of all students gained full credit in this question, with a minority achieving 2 marks as they neglected to give the final rounded figure. One mark was awarded for a division where the numerator and denominator were reversed but where correct rounding, in this case to 1, was evident. The most frequent error was to subtract 484 from 944 with a final response of 460. Students occasionally made simple mistakes when copying down the figures from the question. 33% of students scored no credit at all.

05.5 Nearly 60% of students scored full marks in this question, with over a third scoring zero. Of the incorrect answers seen, the majority had the correct words, but in the wrong position in the equation.

05.6 The most common mark awarded in this question was 1 (with over 40% of students scoring this mark), with less than 3% scoring full marks and 30% scoring zero. In the majority of responses, a lack of understanding of respiration was noted, and confusion between breathing and respiration was common. Common incorrect ideas were that 'more oxygen will be needed so the fish respires more', 'more respiration happens because the oxygen debt has to be repaid' or 'during swimming, more water moves over the gills, so more oxygen gets in as the fish respires'. Other answers suggested an increased rate of respiration was due to the 'heart beating faster'. Reference to 'swimming' (as given in the question) gained no additional credit unless there was reference to 'movement' or 'muscle' involvement. Students continue to write about energy in incorrect contexts and credit was not awarded for responses suggesting that energy was being 'produced' or being 'used for respiration'.