AQA GCSE Biology | 8461

SPECIFICATION POINT 4.7.3.2

Waste management

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**43**
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.

4.7.3.2 Waste management

Answer 01 · Mark scheme June 2007 | BLY1B | Original Q4 | Legacy

Four	**A**	burning fuels that release sulfur dioxide	**3**
	B	digging a new quarry	**4**
	C	sewage disposal	**2**
	D	using pesticides on crops	**1**

Answer 02 · Mark scheme June 2007 | BLY1F | Original Q8 | Legacy

The full source mark scheme begins on page 45. Follow original question 8 in that document.

Answer 03 · Mark scheme November 2007 | BLY1B | Original Q1 | Legacy

One	**A**	carbon dioxide	**4**
	B	sewage	**2**
	C	pesticide	**1**
	D	sulfur dioxide	**3**

Answer 04 · Mark scheme November 2007 | BLY1B | Original Q4 | Legacy

Four	**A**	glass	**2**
	B	paper	**1**
	C	plastic	**4**
	D	steel	**3**

4.7.3.2 Waste management

Answer 05 · Mark scheme

January 2008 | BLY1F | Original Q1 | Legacy

Question 1

	answers	extra information	mark
(a)(i)	saves trees / woods / forests	allow reference to litter / waste tips allow more energy efficient	1
(a)(ii)	fewer quarries / mines	allow saves resources / raw materials allow reference to litter / waste tips allow more energy efficient	1
(b)(i)	eg less pollution from power stations	allow saves electricity allow uses renewable energy source owtte allow saves fuel ignore uses energy from sun	1
(b)(ii)	eg less need for reservoirs	allow uses of water / reuse of water accept conserves water / less mains water ignore stores water	1
(b)(iii)	eg less pollution in rivers	allow uses of fertiliser accept reduces the amount of sewage / pollution ignore turned into fertiliser	1
total			5

4.7.3.2 Waste management

Answer 05 · Mark scheme

January 2008 | BLY1F | Original Q1 | Legacy

BLY1F

4.7.3.2 Waste management

Answer 06 · Mark scheme January 2008 | BLY2F | Original Q7 | Legacy

Question 7

	answers	extra information	mark
(a)(i)	**D**		1
(a)(ii)	**A**		1
(b)(i)	air / oxygen (can enter)	ignore other factors entering or leaving	1
	for (aerobic) respiration	do **not** accept anaerobic respiration	1
(b)(ii)	(more) minerals / nutrients /salt(s) / ions **or** named mineral / element available	ignore fertility / fertiliser allow symbols allow eg mulching / reducing weeds **or** retain water	1
total			5

4.7.3.2 Waste management

Answer 07 · Mark scheme March 2008 | BLY1BP | Original Q6 | Legacy

Six	**A** carbon dioxide **3** **B** pesticide **4** **C** fertiliser **1** **D** sewage **2**			
	A	**B**	**C**	**D**

Answer 08 · Mark scheme June 2008 | BLY1BP | Original Q2 | Legacy

Two	**A** acid rain **3** **B** pesticide **4** **C** methane **1** **D** sulfur dioxide **2**	

Answer 09 · Mark scheme November 2008 | BLY1BP | Original Q2 | Legacy

Two	**A** herbicide **3** **B** methane **2** **C** sulfur dioxide **1** **D** carbon dioxide **4**	

Answer 10 · Mark scheme November 2008 | BLY1BP | Original Q9 | Legacy

Nine	**4**	**2**	**1**	**2**

4.7.3.2 Waste management

Answer 11 · Mark scheme

January 2009 | BLY2F | Original Q4 | Legacy

question	answers	extra information	mark
4(a)	respiration	clear indication eg tick, underlining, others crossed out	1
4(b)	lungs		1
4(c)	liver		1
4(d)	amino acids		1
Total			**4**

4.7.3.2 Waste management

Answer 11 · Mark scheme January 2009 | BLY2F | Original Q4 | Legacy

COMPONENT NUMBER: BLY2F

COMPONENT NAME: Additional Science / Biology

STATUS: Final

DATE: January 2009

Answer 12 · Mark scheme March 2009 | BLY1BP | Original Q8 | Legacy

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

Answer 13 · Mark scheme June 2009 | BLY1BP | Original Q6 | Legacy

Six	**1**	**2**	**4**	**4**

Answer 14 · Mark scheme June 2009 | BLY1BP | Original Q9 | Legacy

Nine	**2**	**2**	**1**	**3**

4.7.3.2 Waste management

Answer 15 · Mark scheme June 2009 | BLY2F | Original Q8 | Legacy

Question 8

question	answers	extra information	mark
8(a)(i)	increase / higher / faster / quicker numerical comparison eg from 30 to 60 / by 30 **or** it is 30 at 15°C and 60 at 25°C	 award **2** marks for doubles / goes twice as fast or 30 units <u>more</u>	1 1
8(a)(ii)	any **two** from: • oxygen / air (in) • for microorganisms / bacteria / microbes / fungi / decomposers • (for aerobic) respiration • let heat out • heat kills microorganisms	 do **not** accept lets oxygen / air out ignore reference to other substances / light passing in or out ignore microorganisms passing in ignore worms / germs / bugs ignore heat in	2
8(b)	compost contains minerals / nutrients / elements / ions / named	allow improve moisture / drainage allow nitrogen ignore CO_2 / food / goodness / fertilisers do **not** accept vitamins / glucose etc	1
Total			**5**

4.7.3.2 Waste management

Answer 16 · Mark scheme

June 2009 | BLY3F | Original Q6 | Legacy

Question 6

question	answers	extra information	mark
6(a)	A	no mark – can be specified in reason part if B given = no marks throughout if unspecified plus two good reasons = 1 mark	
	high(er) pressure in A	allow opposite for B do not accept 'zero pressure' for B	1
	pulse / described in A	accept fluctuates / 'changes' allow reference to beats / beating ignore reference to artery pumping	1
6(b)(i)	17		1
6(b)(ii)	68	accept correct answer from candidate's (b)(i) x 4	1
6(c)(i)	oxygen / oxygenated blood	allow adrenaline ignore air	1
	glucose / sugar	extra wrong answer cancels eg sucrose / starch / glycogen / glucagon / water allow fructose as an alternative to glucose ignore energy ignore food	1

Question 6 continues on the next page…

4.7.3.2 Waste management

Answer 16 · Mark scheme

BLY3F

Question 6 Continued

6(c)(ii)	carbon dioxide / CO_2 / lactic acid	allow CO2 / CO^2 ignore water	1
Total			**7**

4.7.3.2 Waste management

Answer 17 · Mark scheme

January 2010 | BLY1F | Original Q7 | Legacy

Question 7

question	answers	extra information	mark
7(a)	any **one** from eg: • shorter distance between samples • sample to greater height • specify the size of each site	 ignore repeat investigation / measurements ignore longer transect	1
7(b)(i)	Parmelia		1
7(b)(ii)	Evernia		1
7(c)	any **two** from: • Lecanora does not extend over whole range of transect / does not grow everywhere /does not grow in town centre / does not grow in countryside • Lecanora grows in a range of sulfur dioxide concentrations ***or*** Lecanora only grows in limited range of sulfur dioxide concentrations **or** Lecanora lives over large range of sulfur dioxide concentrations • other factors eg different pollutant might also influence growth of Lecanora • sulfur dioxide / pollutant concentration was not measured • amount of Lecanora not measured	 ignore Lecanora does not give accurate measure of sulfur dioxide concentration	2
Total			**5**

4.7.3.2 Waste management

Answer 18 · Mark scheme

March 2010 | BLY1BP | Original Q2 | Legacy

Two	**A**	biodiversity	**2**
	B	pollution	**4**
	C	global warming	**3**
	D	deforestation	**1**

Answer 19 · Mark scheme

March 2010 | BLY1BP | Original Q7 | Legacy

Seven	**3**	**3**	**1**	**1**

Answer 20 · Mark scheme

June 2010 | BLY1BP | Original Q5 | Legacy

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

4.7.3.2 Waste management

Answer 21 · Mark scheme

June 2010 | BLY2F | Original Q7 | Legacy

Question 7

question	answers	extra information	mark
7(a)(i)	20		1
7(a)(ii)	one tenth / 0.1 / 10% / 1:9 / 1 in 10 / 1 out of 10 / $\frac{1}{10}$	for correct answer irrespective of working **2** marks ignore any units accept equivalent fractions eg $\frac{4}{40}$ / $\frac{2}{20}$ do **not** allow eg 1:10 / 1 to 10 if answer is incorrect clear selection of 2 **and** 20, **or** equivalent **or** 1:4:5 / 1:5:4 gains **1** mark	2
7(b)	any **two f**rom: • (body) heat / maintaining body temperature • movement (max 2) • growth / cell division / repair / reproduction / building molecules • accept active transport	do **not** accept sweating / cooling / excretion allow keep warm allow **2 different** examples of movement, internally and / or externally eg breathing / exercise / eating / circulation allow muscle contraction if no other muscle action is credited movement + breathing = 1 mark allow examples eg making proteins (from amino acids) ignore 'chemical reactions' / digestion	2

Question 7 continues on the next page

4.7.3.2 Waste management

Answer 21 · Mark scheme

BLY2F

Question 7 continued

question	answers	extra information	mark
7(c)	more movement / have to hunt / catch food	allow converse if stated for herbivore eg herbivores food is all around ignore reference to size **or** predator unqualified	1
7(d)	any **two** from • less movement • less heat loss • less respiration	ignore reference to food allow no movement allow less space to move ignore less space unqualified allow no heat loss **or** they are kept warm	2
Total			**8**

4.7.3.2 Waste management

Answer 22 · Mark scheme November 2010 | BLY1BP | Original Q1 | Legacy

Question	Key		
One	**A**	causes acid rain	**2**
	B	causes less carbon dioxide to be taken out of the atmosphere	**1**
	C	may pollute farmland with poisonous chemicals	**3**
	D	produces methane	**4**

Answer 23 · Mark scheme November 2010 | BLY1BP | Original Q9 | Legacy

Nine	**1**	**3**	**3**	**1**

Answer 24 · Mark scheme January 2011 | BLY1F | Original Q6 | Legacy

Question 6

question	answers	extra information	mark
6(a)	methane		1
6(b)	fertiliser		1
6(c)	fuel		1
6(d)	the greenhouse effect		1
Total			**4**

Answer 24 · Mark scheme January 2011 | BLY1F | Original Q6 | Legacy

BLY1F

Answer 25 · Mark scheme March 2011 | BLY1BP | Original Q2 | Legacy

Two	**A**	carbon dioxide	**2**
	B	herbicide	**3**
	C	sulfur dioxide	**1**
	D	pesticide	**4**

4.7.3.2 Waste management

Answer 26 · Mark scheme June 2011 | BLY1BP | Original Q2 | Legacy

Two	**A**	burning fuels that release carbon dioxide	3
	B	building new houses	4
	C	spraying crops with pesticides	2
	D	using weedkillers on crops	1

Answer 27 · Mark scheme June 2011 | BLY1BP | Original Q4 | Legacy

Four	**A**	invertebrates	2
	B	lichens	1
	C	rice crops	4
	D	trees	3

Answer 28 · Mark scheme November 2011 | BLY1BP | Original Q2 | Legacy

Two	**A**	deforestation	**3**
	B	recycling waste	**2**
	C	less cattle farming	**4**
	D	treating sewage	**1**

4.7.3.2 Waste management

Answer 29 · Mark scheme

January 2012 | BL1FP | Original Q5 | Legacy

Question 5

question	answers	extra information	mark
5(a)(i)	(compost produced) quicker / faster / takes less time	it = tumbler bin answers should be comparative eg **only** 6 weeks = 1 mark 6 weeks = 0 marks	1
5(a)(ii)	any **two** from: • takes less space • cheaper (to buy) • don't need to turn / rotate it	it = fixed bin references to space and cost should be comparative do **not** accept unqualified data	2
5(b)(i)	any **two** from: • faster rise (in tumbler) • higher (in tumbler) **or** 2 correct number readings • levels off (in tumbler) **or** continues to rise in fixed	it = tumbler bin ignore eg faster compost	2
5(b)(ii)	microorganisms / microbes / decomposers aerobic	allow bacteria / fungi / detritus feeders / worms / other named examples of detritus feeders / mould allow air(y) allow oxygen(ated)	1 1

Question 5 continues on the next page . . .

BL1FP

Question 5 continued

question	answers	extra information	mark
5(b)(iii)	faster respiration / decay / **or** microorganisms / microbes / decomposers work faster (in tumbler) so more heat produced (in tumbler) **OR** more air / more oxygen(ation) (in tumbler) (1) so more respiration / faster decay / bacteria work faster (in tumbler) (1)	allow converse allow bacteria / fungi / mould ignore heat produced by friction	1 1
Total			**9**

4.7.3.2 Waste management

Answer 29 · Mark scheme January 2012 | BL1FP | Original Q5 | Legacy

BL1FP

4.7.3.2 Waste management

Answer 30 · Mark scheme

January 2013 | BL2FP | Original Q6 | Legacy

Question 6

question	answers	extra information	mark
6(a)	any **two** from: • constant speed • constant effort • constant temperature	**or** allow converse for outdoors • variable speed • variable terrain • traffic conditions • variable temperature • wind (resistance) • rain / snow } allow weather allow pollution only if qualified by effect on body function but ignore pollution unqualified if no other marks obtained allow variable conditions outdoors	2
6(b)	Brain		1
6(c)(i)	20 800	correct answer with or without working gains **2** marks if answer incorrect, allow **1** mark for use of 1200 and 22 000 only	2
6(c)(ii)	oxygen glucose / sugar	apply list principle do **not** accept other named substances eg CO_2 water allow glycogen ignore food / carbohydrate	1 1
6(c)(iii)	respire aerobically		1
6(c)(iv)	carbon dioxide lactic acid		1 1
6(d)	increased heart rate	ignore adrenaline / drugs accept heart beats more but not heart pumps more	1
Total			**11**

4.7.3.2 Waste management

Answer 30 · Mark scheme January 2013 | BL2FP | Original Q6 | Legacy

BL2FP

4.7.3.2 Waste management

Answer 31 · Mark scheme

June 2013 | BL1FP | Original Q4 | Legacy

Question 4

question	answers	extra information	Mark
4(a)	sulfur dioxide		1
4(b)(i)	mutation		1
4(b)(ii)	pale form now (more) easily seen (by predators) **or** dark form now less easily seen (by predators) so pale form (more) likely to be eaten **or** dark form less likely to be eaten so dark form (more likely to) breed / pass on genes **or** pale form less likely to breed / pass on genes	accept ref to camouflage	1 1 1
4(c)(i)	pyramid of three layers of diminishing size three labels in food chain order	either way up award 2 marks only if the pyramid is correctly labelled accept trees / birch accept (peppered) moth(s) / larvae	1 1
4(c)(ii)	some material is lost in waste from the birds peppered moth larvae do not eat all the leaves from the trees		1 1
Total			9

4.7.3.2 Waste management

Answer 32 · Mark scheme

June 2013 | BL1FP | Original Q5 | Legacy

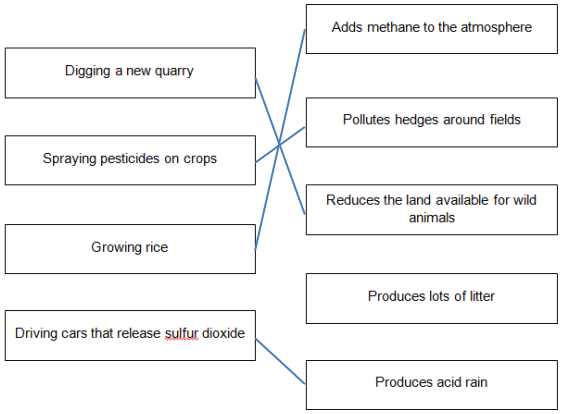
Question 5

question	answers	extra information	Mark
5(a)	8.05 / 8.1 / 8	correct answer with or without working gains **2** marks allow **1** mark for 8.0 **or** 8.10 allow 35/100 x 23 (million) for **1** mark if no answer or incorrect answer allow **1** mark for 805 **or** 8 050 000	2
5(b)(i)	any **one** from: • less landfill sites used • less cost (of landfill sites) / saves money • less effort / cost to collect	allow less to collect	1
5(b)(ii)	compost can be used on garden	allow idea of compost can be used to help plant growth **or** compost provides minerals / named **or** compost improves the soil	1
Total			**4**

4.7.3.2 Waste management

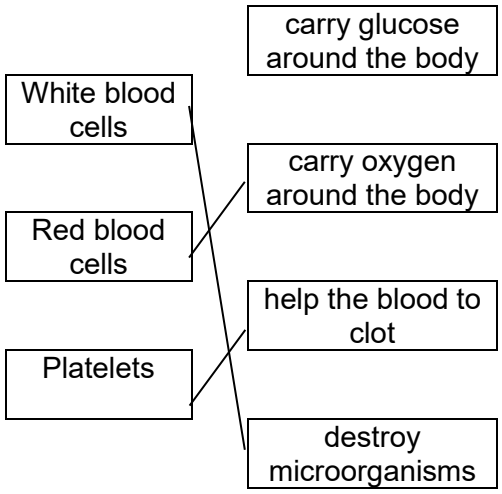
Answer 33 · Mark scheme June 2013 | BL3FP | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)		**1** mark for each correct line extra line from box in left hand column cancels mark	4
1(b)	any **two** from: • climate change • more extreme weather / changes to weather (patterns) / described • rise in sea level • melting of ice caps • reduced biodiversity • changes to migration patterns • changes in distribution of species	ignore 'Earth warmer' accept faster plant growth / tropical species can be grown in UK accept tropical diseases / example spread to temperate regions	2
Total			**6**

4.7.3.2 Waste management

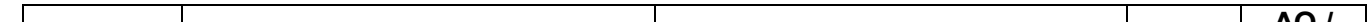
Answer 34 · Mark scheme June 2014 | BL3FP | Original Q1 | Legacy

Question	Answers	Extra information	Mark	AO / spec ref.
1(a)(i)		one mark for each line extra line negates a mark	3	AO1 3.2.2c, d,e
1(a)(ii)	any **one** from: • carbon dioxide / CO_2 • urea	do **not** allow urine ignore water ignore ions	1	AO1 3.2.2b
1(b)(i)	B		1	AO1 3.2.1d
1(b)(ii)	D		1	AO1 3.2.1d
1(b)(iii)	vein	accept correct named examples	1	AO1 3.2.1e
1(c)(i)	any **one** from: • keeps artery / blood vessel open **or** widens artery / blood vessel • allows (more) blood to heart / cardiac muscle • (allows) blood to flow more easily • allows (more) oxygen to heart / cardiac muscle		1	AO1 3.2.1f
1(c)(ii)	any **two** from: • bleeding • infection • damaging blood vessels • damaging the heart • risk from anaesthetic	allow blood clots	2	AO3 3.2
Total			10	

4.7.3.2 Waste management

Answer 34 · Mark scheme

June 2014 | BL3FP | Original Q1 | Legacy



4.7.3.2 Waste management

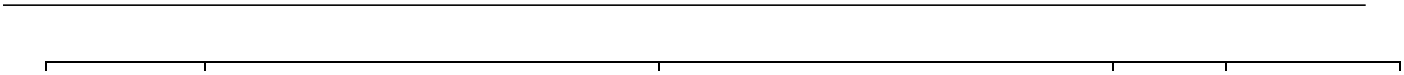
Answer 35 · Mark scheme June 2015 | BL1FP | Original Q5 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)	any **two** from: • amount of waste on each heap • (type of) materials on each heap • put heaps in same (environmental) conditions	 allow size of heap if neither marking points one or two awarded, allow **1** mark for same waste eg keep at same (outside) temperature allow put in same place	2	AO3 1.6.1
5(b)	microorganisms / microbes / bacteria / fungi / decomposers	ignore detritivores / examples (such as worms, maggots, insects) ignore pathogens / germs do **not** allow viruses	1	AO1 1.6.1b
5(c)(i)	oxygen / air added (when turning over)	allow idea that decay will be aerobic allow bacteria / microorganisms need oxygen / air allow (microorganisms) respire faster	1	AO2 1.6.1b
5(c)(ii)	any **two** from: • dead leaves / fruit / plants (fall off / onto the ground) • (fallen dead leaves / fruit / plants) decay • minerals / ions / nutrients are recycled / released	ignore references to carbon dioxide allow animal waste **or** dead animals	2	AO2 / AO3 1.6.1d
Total			**6**	

4.7.3.2 Waste management

Answer 35 · Mark scheme

June 2015 | BL1FP | Original Q5 | Legacy



4.7.3.2 Waste management

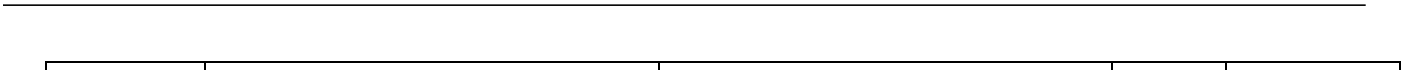
Answer 36 · Mark scheme June 2015 | BL3FP | Original Q2 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)	any **one** from: • increased pollution • dumping waste	allow described consequence eg vermin accept (increased) landfill accept (increased) fly tipping	1	AO1 341a
2(b)(i)	(mass of SO_2) decreases and then levels off / plateaus		1 1	AO2 341b
2(b)(ii)	2008	clear evidence of calculating 700 (000) = 1 mark	2	AO2 341
2(b)(iii)	any **one** from: • acid rain • erosion of statues / buildings • destruction of habitats • reduction in biodiversity • damage to lichen • breathing problems	ignore reference to ozone layer allow damage to plants	1	AO1 341b
2(c)	Carbon dioxide being absorbed in oceans and lakes Photosynthesis by trees		1 1	AO1 343b,342a
Total			**8**	

4.7.3.2 Waste management

Answer 36 · Mark scheme

June 2015 | BL3FP | Original Q2 | Legacy



4.7.3.2 Waste management

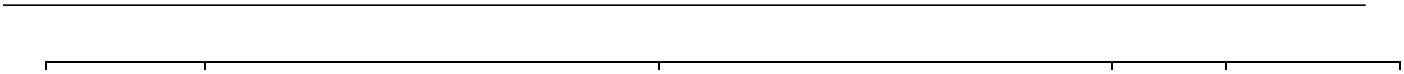
Answer 37 · Mark scheme June 2015 | BL3FP | Original Q3 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3(a)	Lung		1	AO1 331a
3(b)	Filtering the blood		1	AO1 331c
3(c)	They will take in water and burst		1	AO2 311f,331b
3(d)(i)	6		1	AO2 331c/d/e
3(d)(ii)	less than 28		1	AO2 331c/d/e
3(d)(iii)	urea not reabsorbed **or** dialysis (fluid) has removed urea		1	AO2 331c/d/e
3(e)(i)	antibodies		1	AO1 331g/h
3(e)(ii)	Tissue typing the donor kidney		1	AO1 311i
Total			**8**	

4.7.3.2 Waste management

Answer 37 · Mark scheme

June 2015 | BL3FP | Original Q3 | Legacy



4.7.3.2 Waste management

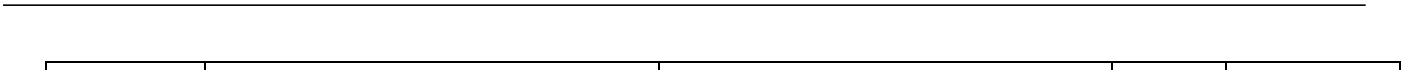
Answer 38 · Mark scheme June 2015 | BL3FP | Original Q7 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7(a)(i)	fungus		1	AO1 344d
7(a)(ii)	oxygen / O_2	accept air accept O_2 do **not** allow O^2/ O / O2	1	AO2 344d
7(a)(iii)	glucose (syrup)	allow carbohydrate / sugar ignore food / starch allow oxygen if oxygen / air not given in (a)(ii)	1	AO1 344d
7(b)	any **two** from: • quicker • suitable for vegetarians • cheaper • more efficient **or** less land / methane	ignore high in protein ignore sustainability unqualified ignore less pollution unqualified allow less animals harmed / killed allow food chain is shorter **or** has less trophic levels allow less energy lost (from the food chain) do **not** allow no energy lost allow low(er) in calories (than some meat) allow low(er) in fat / healthier (than some meat) allow source of fibre / prevent constipation	2	AO3 344a/d
Total			**5**	

4.7.3.2 Waste management

Answer 38 · Mark scheme

June 2015 | BL3FP | Original Q7 | Legacy



4.7.3.2 Waste management

Answer 39 · Mark scheme

June 2017 | BL3FP | Original Q7 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7			6	AO1 3.3.1a/c 3.1.2b

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.

0 marks	Level 1 (1–2 marks)	Level 2 (3–4 marks)	Level 3 (5–6 marks)
No relevant content	The name (N) of a waste product is given **or** a process (P) that makes a waste product **or** an organ (O) involved	The name of a waste product is given which is linked to **either** the process that it is made in **or** the organ involved	The names of waste products are given of which at least one is correctly linked to the process it is made in **and** the organ(s) involved

examples of the points made in the response

- (N) urea
- (P) from the breakdown of amino acids
- (O) (amino acids broken down) in the liver
- (O) removed by kidneys
- (O) bladder removes urine (from the body)

- (N) CO_2
- (P) from respiration
- (O) in a named organ **or** in cells
- (O) breathed out from lungs

- (N) water
- (P) from respiration
- (O) in a named organ **or** in cells
- (O) breathed out from lungs
- (O) through skin (by sweating)
- (O) by kidneys
- (O) bladder removes urine (from the body)

extra information
ignore faeces

'Give credit for any extra correct knowledge – eg toxins are broken down in the liver and the products removed in kidneys/urine.'

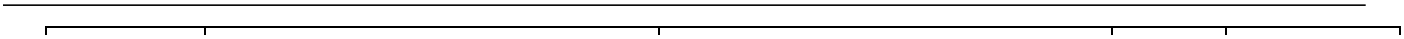
- (N) ions
- (P) from eating and drinking
- (O) skin (through sweating)
- (O) by kidneys
- (O) bladder removes urine (from the body)

Total		6

4.7.3.2 Waste management

Answer 39 · Mark scheme

June 2017 | BL3FP | Original Q7 | Legacy



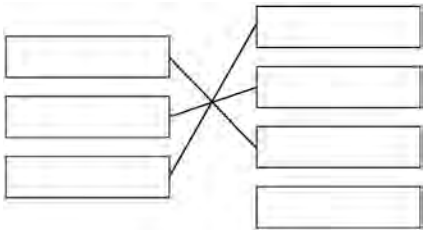
4.7.3.2 Waste management

Answer 40 · Mark scheme June 2017 | BL3FP | Original Q8 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
8(a)	Causes acid rain		1	AO1 3.4.1b
8(b)(i)	66(%) or 65.7(%)	allow 1 mark for 920 **or** ecf from first line	2	AO2 3.4.1b
8(b)(ii)	it rises **and** then falls maximum level in 2005 **or** maximum reached at 400 (thousand tonnes)		1 1	AO2 3.4.1b
Total			**5**	

4.7.3.2 Waste management

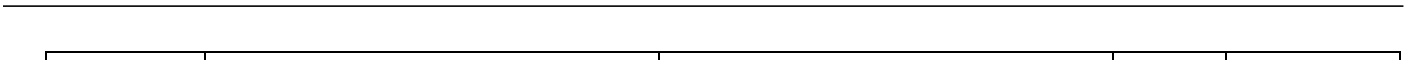
Answer 41 · Mark scheme June 2018 | 8461/2F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1		extra line from a scientific term cancels the mark	1 1 1	AO2 4.7.4.1
01.2	$\frac{10}{200} \times 100$ 5 / 5.0	an answer of 5 / 5.0 scores **2** marks	1 1	AO2 4.7.4.3
01.3	digestion respiration excretion	in this order only	1 1 1	AO2 4.5.3.3 4.7.4.3
01.4	fewer are eaten (by small fish)	allow there are fewer (small) fish eating them do **not** accept none are eaten	1	AO2 4.7.4.1
Total			**9**	

4.7.3.2 Waste management

Answer 41 · Mark scheme

June 2018 | 8461/2F | Original Q1



4.7.3.2 Waste management

Answer 42 · Mark scheme

June 2022 | 8461/2F | Original Q4

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	bacteria		1	AO3 4.7.1.2 4.7.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.2	any **two** from: • bacteria increase **before** protozoa increase **or** when bacteria are high, protozoa increase • as protozoa increase, bacteria decrease • (after site **A**) as bacteria decrease, protozoa also decrease	allow protozoa increase **after** bacteria increase allow when bacteria are low, protozoa are low	2	AO3 4.7.1.1 4.7.1.3 4.7.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	(aerobic) respiration	do **not** accept anaerobic respiration	1	AO1 4.7.1.2 4.7.3.2 4.4.2.1

4.7.3.2 Waste management

Answer 42 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	(algae carry out) photosynthesis (which) produces oxygen	 allow algae produce oxygen	1 1	AO2 4.7.3.2 4.4.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5	bars plotted correctly suitable shading	allow a tolerance of ± ½ a small square ignore column widths	1 1	AO2 4.7.1.2 4.7.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.6	more sludge worms at **A** (than at **B)** no mayfly nymphs at **A and** mayfly nymphs present at **B**	answers must be comparative allow fewer sludge worms at **B** (than at **A)** allow high number of sludge worms at **A and** low number at **B** allow more mayfly nymphs at **B** (than at **A**)	1 1	AO3 4.7.1.2 4.7.3.2

Total Question 4		10

4.7.3.2 Waste management

Answer 43 · Mark scheme

June 2025 | 8461/2F | Original Q7

Question 7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	100 – 60 – 3 37 (%)	allow 100 – 63	1 1	AO2 4.7.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.2	*(conclusion 1)* (chicken manure) produces more biogas **or** (chicken manure) produces biogas at a faster rate *(conclusion 2)* more biogas produced (in the first week) **or** the line / graph is steep (in the first week) *(conclusion 3)* no (more) biogas produced (after 4 weeks) **or** not much more biogas produced (after 4 weeks)	allow correct pairs of data for chicken and cow eg 600 for chicken and 400 for cow allow use of figures from graph for chicken / cow to illustrate 'more' allow the line / graph levels off (after 4 weeks)	1 1 1	AO3 4.7.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.3	increases increases stays the same	in this order only	1 1 1	AO3 4.7.2.3

4.7.3.2 Waste management

Answer 43 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.4	any **one** from: • transport costs money • fish fat costs money • fish fat has an unpleasant smell • fish fat attracts animals	 allow it is too far to transport allow it takes too long to transport allow uneconomic	1	AO3 4.7.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.5	so plants / crops grow faster / better (because manure) releases / contains minerals / ions / salts	 allow named mineral / ion(s) / salts allow (because manure): • retains water in soil • improves drainage • insulates / keeps warm • suppresses weed growth • improves soil structure ignore nutrients / nitrogen / food / carbon dioxide if no other marks awarded allow 'it is a fertiliser' for **1** mark	1 1	AO2 4.7.2.3

Total Question 7	**11**

4.7.3.2 Waste management

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

4.7.3.2 Waste management

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.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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Dr Michael Cresswell, Director General.

4.7.3.2 Waste management

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.

4.7.3.2 Waste management

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.

4.7.3.2 Waste management

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

4.7.3.2 Waste management

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

4.7.3.2 Waste management

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

4.7.3.2 Waste management

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

4.7.3.2 Waste management

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:		2
	• no immunity **or** antibodies ineffective	accept no resistance	
	• no vaccines **or** humans not immunised		
	• idea of large scale contact **or** large scale travel	do **not** accept passed on ignore no cure	
total			5

4.7.3.2 Waste management

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

4.7.3.2 Waste management

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

4.7.3.2 Waste management

Answer 42 · Examiner comments

June 2022 | 8461/2F | Original Q4

Question 4

This question was about the effects of untreated sewage entering a river.

04.1 The vast majority of students were able to select *bacteria* as the type of organism that had the most rapid increase in numbers in **Figure 6** when sewage entered the river.

04.2 Although many students gained one mark for the idea that the numbers of both organisms decrease (further down the river) or that bacteria decrease when the protozoa increase, relatively few students put both of these ideas in their response as evidence that the protozoa in the river feed on bacteria. Students commonly described bacteria and protozoa increasing simultaneously at the point of sewage entry, which does not indicate the feeding relationship. A small proportion of students gave details about other populations in the river which were not asked for in the question.

04.3 The process responsible for the decrease in oxygen concentration when the sewage entered the river was given as *respiration* by only half the students. The most common incorrect response was 'photosynthesis'. Some correctly suggested 'aerobic respiration' but a few qualified respiration incorrectly as being 'anaerobic'.

04.4 There were many who gained one mark, to account for the parallel increases of both algae and oxygen concentration in the river, by referring either to photosynthesis or to the idea that algae produce oxygen, but only one in six could put both ideas together. It was often evident from the detail in their answers that these students had revised this part of the Specification well.

Answer 42 · Examiner comments

June 2022 | 8461/2F | Original Q4

04.5 It was surprising that so many students (almost 10 percent) made no attempt at this question which involved plotting bars on the graph rather than writing on an answer line. Most of those who did gained both marks, with accurate plotting of the values given in **Table 2** and appropriate shading. Some students appeared to have forgotten to use a pencil in their drawing, perhaps not bringing one to the examination at all; so when errors were made, they had difficulty erasing them. The most common errors were to omit the bar for the 80 sludgeworms at site **A**, to plot 8 as 6 for the bloodworms at site **B** and to omit any attempt at shading to parallel that given in the key.

04.6 The relationship between oxygen concentrations at sites **A** and **B** and the relative populations of sludge worms and mayfly nymphs at these sites was expressed in a variety of ways, although just over a quarter gained both marks for making the correct comparisons for population sizes of the two species. Weaker students often quoted data from **Table 2** but did not include comparisons, while some referred to all the organisms in the table.

4.7.3.2 Waste management

Answer 43 · Examiner comments

June 2025 | 8461/2F | Original Q7

Question 7 (Low and Standard demand)

07.1

Many students were able to calculate the percentage of carbon dioxide in the biogas. Some wrote the necessary sum correctly and then possibly entered it into their calculator incorrectly to arrive at the wrong answer and thus gained just the one mark. Others knew it was necessary to subtract 63 from 100 but sadly arrived at an answer of 27 or 47.
The most common ways of not being able to score a mark were to involve 360 in the calculation or to subtract 3 from 60. In total, just over a third of students gained both marks.

07.2

Students were given a graph on the production of biomass from chicken and cow manure and asked to given evidence for 3 scientific conclusions. Over a third of students gained 2 of the available 3 marks, with mark points 1 and 3 being commonly seen. Many gained mark point 1 by giving the values for production of the two types of manure. Some could not be awarded mark point 1 for stating that more chicken *manure* was produced rather than more biogas.

4.7.3.2 Waste management

Answer 43 · Examiner comments

For mark point 3, reference to the line going straight after 4 weeks was not equivalent to the idea of the line levelling off and so did not gain credit.
Answers to mark point 2 were often ineffectively expressed and so students were unable to score this mark. Many students referred to the rate being fastest in the first week and then slowing down which was not creditworthy as just being a repeat of the question stem.
Students who tried to use data to support the conclusion often just gave the numbers for the production from the two types of manure after the first week which was insufficient for credit, without further qualification.

07.3
All combinations of words were seen, with some students seemed to think that they had to use all three options despite the instructions to the contrary. A pleasing 80% of students gained the full 3 marks.

07.4
Only 20% of students gained this mark.
All marking points were seen with the issues of cost being those most commonly credited. Many students missed out on the mark by referring to the distance from the sea without any mention of the implication of that on transport, time or cost. Several students gave the idea of the production of more biogases being a bad thing for the environment – which was not creditworthy.

07.5
Just under 10% of students gained both marks for fully explaining why the farmer spreads the manure on fields where crops will be grown. However, 70% of students did gain 1 mark – most commonly for the idea of helping the crops to grow. Many students gave an answer that included both mark point 1 and the compensation mark – which could consequently only be awarded 1 mark. The majority of students missed out on mark point 2 by referring to nutrients rather than to the more specific minerals/ions. The 'allows' in the extra information were rarely seen.