AQA GCSE Biology | 8461

SPECIFICATION POINT 4.3.1.7

Vaccination

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**33**
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.

4.3.1.7 Vaccination

Answer 01 · Mark scheme January 2007 | BLY1F | Original Q4 | Legacy

Question 4

	answers	extra information	mark
(a)	antibodies antitoxins antibiotics		1 1 1
(b)	any **two** from: • measles • mumps • rubella / German measles		2
(c)	less / low / no chance of getting named / all condition(s) if vaccinated quantitative figure(s) e.g. 5 times less likely to get convulsions	must be comparative	1 1
(d)	enzymes genes		1 1
total			9

4.3.1.7 Vaccination

Answer 02 · Mark scheme March 2007 | BLY1A | Original Q8 | Legacy

Eight	**4**	**1**	**2**	**4**

Answer 03 · Mark scheme June 2007 | BLY1A | Original Q5 | Legacy

Five	**A**	hepatitis type b	**4**
	B	MMR	**1**
	C	pneumococcal infection	**3**
	D	tetanus	**2**

Answer 04 · Mark scheme June 2007 | BLY1A | Original Q8 | Legacy

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

Answer 05 · Mark scheme June 2007 | BLY1F | Original Q2 | Legacy

The full source mark scheme begins on page 36. Follow original question 2 in that document.

Answer 06 · Mark scheme November 2007 | BLY1A | Original Q4 | Legacy

Four	**A**	94	**2**
	B	95	**3**
	C	1400	**4**
	D	6000	**1**

4.3.1.7 Vaccination

Answer 07 · Mark scheme January 2008 | BLY1F | Original Q6 | Legacy

Question 6

	answers	extra information	mark
(a)(i)	lives inside cells		1
(a)(ii)	inactive		1
(a)(iii)	antibodies		1
(b)(i)	1950		1
(b)(ii)	8 (years)		1
(b)(iii)	any **one** from: eg • disease could be reintroduced (from abroad) • disease would spread if it came back • protection on holiday abroad • high proportion of immune people needed to prevent epidemic	disease might come back insufficient	1
total			6

4.3.1.7 Vaccination

Answer 07 · Mark scheme

January 2008 | BLY1F | Original Q6 | Legacy

BLY1F

Answer 08 · Mark scheme

June 2008 | BLY1AP | Original Q6 | Legacy

Six	**A**	antibiotics	**2**
	B	painkillers	**4**
	C	antibodies	**3**
	D	vaccines	**1**

	A	B	C	D

4.3.1.7 Vaccination

Answer 09 · Mark scheme June 2008 | BLY1F | Original Q5 | Legacy

question	answers	extra information	mark
5(a)(i)	antibiotic or named antibiotic	ignore antibodies accept antiseptic do **not** accept disinfectant	1
5(a)(ii)	painkillers	accept named painkillers eg aspirin	1
5(b)(i)	5.5 / 5 ½ weeks		1
5(b)(ii)	rose gains **1** mark rose, then fell then rose again gains **2** marks a further **1** marks for **one** quantitative statement eg • rose for 3 weeks / to 14–15 units • dropped to 4 weeks / 9 units • rose to 7 weeks / 64–65 units		3
5(b)(iii)	(no) level begins to fall / is falling (after 7 weeks)		1
Total			**7**

4.3.1.7 Vaccination

Answer 09 · Mark scheme June 2008 | BLY1F | Original Q5 | Legacy

COMPONENT NUMBER: BLY1F

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: June 2008

Answer 10 · Mark scheme November 2008 | BLY1AP | Original Q4 | Legacy

Four	**A**	falls to almost zero by 25 days	**4**
	B	levels off after 10 days	**1**
	C	reaches a peak at 13 days and then falls slowly	**3**
	D	rises throughout the 25 days	**2**

4.3.1.7 Vaccination

Answer 11 · Mark scheme

January 2009 | BLY1F | Original Q7 | Legacy

question	answers	extra information	mark
7(a)	antibodies	allow antitoxins / memory cells do **not** allow antigens	1
	immune	ignore protection allow resistant	1
7(b)(i)	fell		1
	numerical qualification to zero / nothing / by 100%	allow stopped in 1995	1
7(b)(ii)	(no) % vaccination fell **or** when no vaccination	ignore circle	1
	but autism numbers did not fall / stayed high / increased **or** '(yes) might support it if time lag between vaccination and autism symptoms' / 'time lag for diagnosis' (1) 6 year time lag quantified (1)		1
Total			**6**

4.3.1.7 Vaccination

Answer 11 · Mark scheme January 2009 | BLY1F | Original Q7 | Legacy

COMPONENT NUMBER: BLY1F

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: January 2009

Answer 12 · Mark scheme March 2009 | BLY1AP | Original Q7 | Legacy

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

Answer 13 · Mark scheme June 2009 | BLY1AP | Original Q9 | Legacy

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

Answer 14 · Mark scheme November 2009 | BLY1AP | Original Q7 | Legacy

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

4.3.1.7 Vaccination

Answer 15 · Mark scheme

Question 3

question	answers	extra information	mark
3(a)	measles mumps rubella		1 1 1
3(b)	antibodies		1
3(c)(i)	any **two** from: • fell • then rose • any reasonable amplification eg until 2004 / to 80% • flattens off *(*between 1999–2000*)*		2
3(c)(ii)	eg fear of side effects **or** cost of vaccine **or** lack of vaccine **or** complacency / disease less common		1
Total			**7**

4.3.1.7 Vaccination

Answer 15 · Mark scheme January 2010 | BLY1F | Original Q3 | Legacy

BLY1F

Answer 16 · Mark scheme March 2010 | BLY1AP | Original Q8 | Legacy

Eight	**3**	**4**	**4**	**1**

Answer 17 · Mark scheme June 2010 | BLY1AP | Original Q8 | Legacy

Eight	**4**	**1**	**3**	**1**

Answer 18 · Mark scheme November 2010 | BLY1AP | Original Q2 | Legacy

Two	**A**	painkiller	**4**
	B	penicillin	**1**
	C	thalidomide	**3**
	D	vaccine	**2**

Answer 19 · Mark scheme November 2010 | BLY1AP | Original Q9 | Legacy

Nine	**3**	**2**	**4**	**2**

Answer 20 · Mark scheme March 2011 | BLY1AP | Original Q9 | Legacy

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

Answer 21 · Mark scheme June 2011 | BLY1AP | Original Q9 | Legacy

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

4.3.1.7 Vaccination

Answer 22 · Mark scheme

November 2011 | BLY1AP | Original Q4 | Legacy

Four	**A**	1991	**1**
	B	1994	**3**
	C	1997	**2**
	D	2000	**4**

4.3.1.7 Vaccination

Answer 23 · Mark scheme

January 2012 | BL1FP | Original Q8 | Legacy

Question 8

question	answers	extra information	mark
8(a)	both lead to reduction / fall (in measles cases)	can be implied	1
	measles vaccine caused a big drop **or** correct use of figures		1
	MMR wipes out measles **or** drops to (almost) zero **or** doesn't fall as much as measles vaccine **or** correct use of figures.		1
8(b)	mump(s)	either order	1
	rubella / german measles	allow phonetic spelling	1
8(c)	white blood cells	allow lymphocytes / leucocytes ignore memory cells	1
	(wbc) produce antibodies	ignore antitoxins / antigens / antibiotics / engulfing	1
	in future / if re-infected antibody production rapid / fast(er) / quick(er)	allow ecf from antitoxins / antigens / antibiotics ignore engulfing ignore reference to specificity	1
Total			**8**

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

4.3.1.7 Vaccination

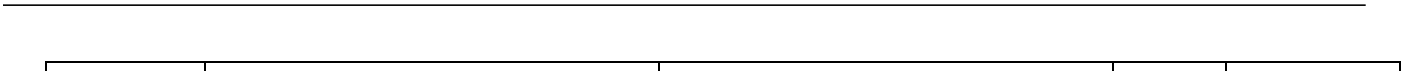
Answer 24 · Mark scheme June 2015 | BL1FP | Original Q2 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)(i)	64		1	AO2 1.1
2(a)(ii)	36	allow e.c.f from (a)(i) i.e. 100 – answer given in (a)(i)	1	AO2 1.1
2(a)(iii)	any **one** from: • only considers 16-year-olds • only about some / 5 countries	ignore lack of evidence allow does not refer to all ages allow does not refer to all countries	1	AO3 1.1
2(b)	the more exercise done the healthier a person is	allow the more exercise done the higher the health rating allow the less exercise done the lower the health rating	1	AO3 1.1.1e
2(c)	having a high cholesterol level		1	AO1 1.1.1d
2(d)(i)	antibodies		1	AO1 1.1.2c/d/e
2(d)(ii)	antibiotics		1	AO1 1.1.2i
Total			**7**	

4.3.1.7 Vaccination

Answer 24 · Mark scheme

June 2015 | BL1FP | Original Q2 | Legacy



4.3.1.7 Vaccination

Answer 25 · Mark scheme June 2016 | BL1FP | Original Q5 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)(i)	hand-washing		1	AO1 1.1.2f
5(a)(ii)	small amounts of dead pathogens		1	AO1 1.1.2l
5(a)(iii)	decrease by 60 (%)	 allow from 70(%) to 10(%) allow other correct data treatment	1 1	AO2 1.1.2
5(b)(i)	penicillin		1	AO1 1.1.2h
5(b)(ii)	any **two** from: • antibiotics only kill bacteria • some bacteria are resistant (to antibiotics) • (correct) antibiotics not always used • deficiency disease(s) not caused by bacteria **or** cannot be treated by antibiotics • inherited disease(s) not caused by bacteria **or** cannot be treated by antibiotics • 'lifestyle' diseases not caused by bacteria **or** cannot be treated by antibiotics	 allow antibiotics do not kill viruses allow MRSA not killed by antibiotics allow course not completed eg heart disease / cancer if no other mark given allow **1** mark for not all diseases are caused by bacteria **or** some diseases are caused by viruses	2	AO2 / AO3 1.1.2h/i/j/k 1.1.1a/d
5(c)	bacteria grow faster	allow this is body temp (at which pathogens grow)	1	AO1 1.1.2o
Total			**8**	

4.3.1.7 Vaccination

Answer 25 · Mark scheme

June 2016 | BL1FP | Original Q5 | Legacy

4.3.1.7 Vaccination

Answer 26 · Mark scheme June 2018 | 8461/1F | Original Q7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	toxins / poisons (secreted by / from / in bacteria)		1	AO1 4.3.1.3
07.2	any **two** from: • wash hands after using toilet / being sick **or** wash hands before preparing / handling food **or** do not prepare food (whilst infected) • isolate yourself • disinfect clothes / surfaces • do not share utensils / cutlery / towels	ignore 'wash hands' unqualified ignore reference to coughing / sneezing allow examples of how isolation could be achieved	2	AO2 4.3.1.1
07.3	antibiotics	allow named examples of antibiotics	1	AO1 4.3.1.8
07.4	immune system is damaged / weakened **or** immune system doesn't function properly white blood cells cannot kill bacteria / *Salmonella* (as effectively)	allow immunocompromised allow lack of / no white blood cells allow no / fewer antibodies so bacteria not killed **or** less phagocytosis so bacteria not killed **or** no / fewer antitoxins to counter toxins	1 1	AO2 4.3.1.2

4.3.1.7 Vaccination

Answer 26 · Mark scheme

June 2018 | 8461/1F | Original Q7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.5	any **one** from: • (give chickens) antibiotics • don't sell infected chickens / eggs • keep infected chickens isolated / indoors • slaughter the infected chickens	allow (give chickens) monoclonal antibodies allow don't sell the chickens / eggs ignore don't sell chickens / eggs allow keep the chickens indoors ignore keep chickens indoors ignore vaccination / chlorination / disinfection	1	AO1 4.3.1.3
07.6	(cleaning liquid) B **and** greater reduction in number of bacteria (after cleaning) in both locations	ignore few bacteria in both locations allow neither / both **and** idea of experimental error	1	AO3 4.1.1.6 4.3.1
07.7	radius (of area with no bacteria growing)	allow diameter (of the area with no bacteria growing) ignore πr^2 unqualified allow idea of placing agar plate onto graph paper and counting the squares not covered with bacteria	1	AO2 4.1.1.6

4.3.1.7 Vaccination

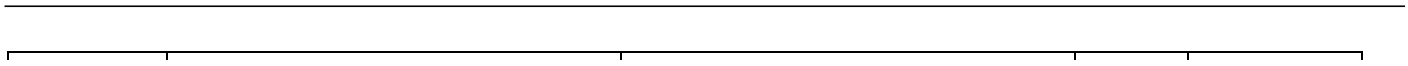
Answer 26 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.8	repeat **and** look to see if results are similar	ignore repeat unqualified allow repeat **and** look to see if results are different allow repeat and see if there are anomalies ignore repeat and identify anomalies ignore repeat and compare unqualified	1	AO3 4.1.1.6
07.9	any **one** from: • toxicity / side / health effects • effect on other types of bacteria / pathogens • interaction with other cleaners • ease of use • dilution factor of each cleaner (vs. cost) • time cleaner is effective for	 ignore harmful / dangerous allow reference to allergies allow not tested on other types of bacteria ignore germs ignore concentration unqualified ignore how long the cleaner lasts for allow reference to odour of cleaning liquid ignore reference to cost unqualified ignore environmental effects / flammability	1	AO3 4.1.1.6
Total			**11**	

4.3.1.7 Vaccination

Answer 26 · Mark scheme

June 2018 | 8461/1F | Original Q7



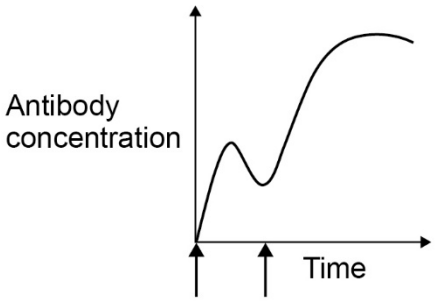
Answer 27 · Mark scheme

November 2020 | 8461/1F | Original Q3

The full source mark scheme begins on page 47. Follow original question 3 in that document.

4.3.1.7 Vaccination

Answer 28 · Mark scheme November 2021 | 8461/1F | Original Q2

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

4.3.1.7 Vaccination

Answer 28 · Mark scheme

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

4.3.1.7 Vaccination

Answer 28 · Mark scheme

November 2021 | 8461/1F | Original Q2

Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.3.1.7 Vaccination

Answer 29 · Mark scheme

June 2022 | 8461/1F | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	sexual intercourse		1	AO1 4.3.1.1 4.3.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	increased (at first) (then) decreased	ignore numbers unqualified do **not** accept an implication of an overall increase if no other mark awarded allow (overall) decrease for **1** mark	1 1	AO3 4.3.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	better education on how to prevent the spread of HIV		1	AO3 4.3.1.1 4.3.1.2

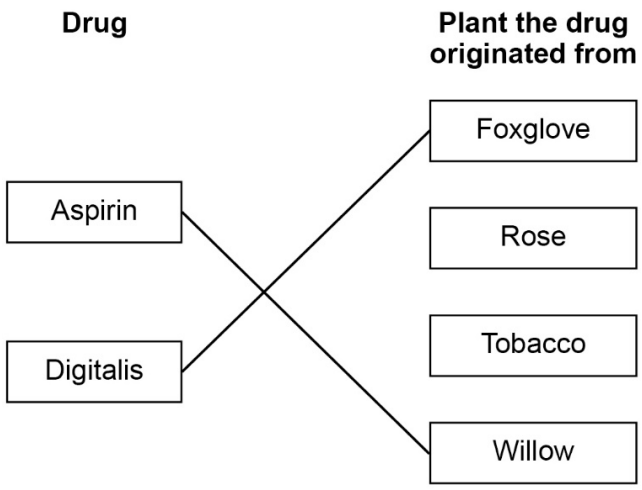
Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	(C) → E → A → B → D	allow **1** mark for E → A link allow **1** mark for A → B link allow **1** mark for B → D link if no other mark awarded allow **1** mark for an answer of (C) → E → B → A → D	3	AO1 4.3.1.1 4.3.1.6 4.3.1.7 4.3.1.2

4.3.1.7 Vaccination

Answer 29 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5	testing on healthy volunteers		1	AO1 4.3.1.9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.6	drugs that destroy viruses also damage body tissues		1	AO1 4.3.1.8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.7	 do **not** accept more than one line from a box on the left		1 1	AO1 4.3.1.1 4.3.1.9

Total Question 1		11

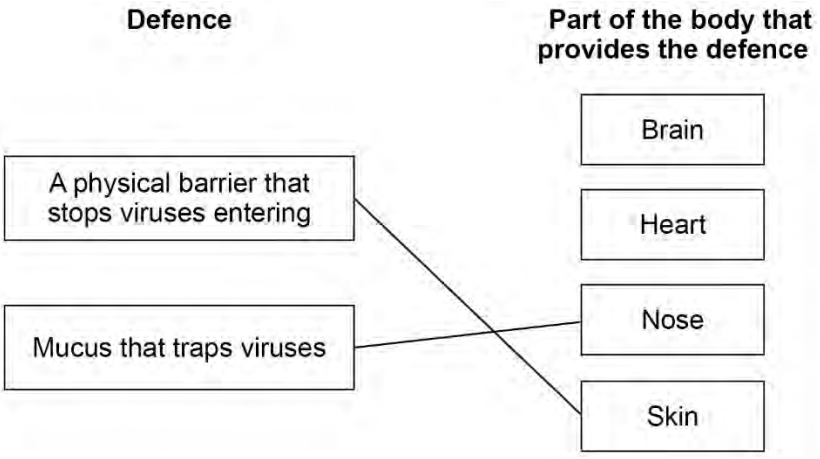
4.3.1.7 Vaccination

Answer 30 · Mark scheme

June 2023 | 8461/1F | Original Q2

Question 2

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.1	pathogens		1	AO1 4.3.1.1

Question	Answers	Mark	AO / Spec Ref.
02.2	 do **not** accept more than one line from a box on the left	1 1	AO1 4.3.1.6

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.3	division		1	AO1 4.2.2.7

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.4	malignant tumours have cells that can spread to other parts of the body malignant tumours may form secondary tumours		1 1	AO1 4.2.2.7

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.5	(percentage) decreases		1	AO3 4.2.2.7 4.2.2.5

4.3.1.7 Vaccination

Answer 30 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.6	more females were vaccinated (over time)	allow males may also be vaccinated allow more people were vaccinated allow increased use of (named) barrier methods of contraception allow more awareness / education (about HPV)	1	AO3 4.2.2.7 4.2.2.5

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.7	white blood cells		1	AO1 4.3.1.7

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.8	antibodies		1	AO1 4.3.1.7 4.3.1.6

Question	Answers	Extra information	Mark	AO / Spec Ref.
02.9	any **one** from: • people are afraid of side / unknown effects • religious / cultural objections • (some people) believe they don't work • some people think (HPV) vaccine encourages sexual activity	ignore pain of injection allow there are side effects allow people think they cause (named) disease ignore religion unqualified ignore moral / ethical objections	1	AO3 4.3.1.7

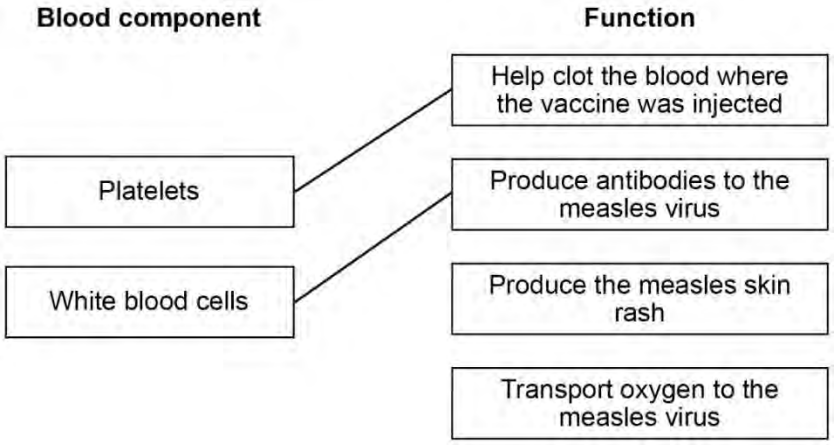
Total Question 2	11

4.3.1.7 Vaccination

Answer 31 · Mark scheme

June 2024 | 8461/1F | Original Q3

Question 3

Question	Answers	Mark	AO / Spec Ref.
03.1	 do **not** accept more than one line from a box on the left	1 1	AO2 4.3.1.7 4.3.1.6 4.2.2.3

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.2	1968	allow 1969	1	AO3 4.3.1.2 4.3.1.7

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.3	increases (then) levels off / plateaus (then) decreases	 allow (then) stays the same allow reaches a maximum between 1956 and 1968 ignore use of numbers of people if no other mark awarded allow **1** mark for (overall) decrease	1 1 1	AO3 4.3.1.2

4.3.1.7 Vaccination

Answer 31 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.4	(the percentage) decreased	allow (the percentage) decreased then increased allow (the percentage) changed from 92% to 80%	1	AO3 4.3.1.2 4.3.1.7

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.5	parents were worried their children would get condition **X**		1	AO3 4.3.1.2 4.3.1.7

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.6	have the research peer reviewed		1	AO2 4.3.1.9

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.7	any **one** from: • (the author was) biased • (the author was) influenced by money • because the research was not peer reviewed • there was not enough evidence • small sample size	ignore (the author) was paid	1	AO3 4.3.1.9

Total Question 3	**10**

4.3.1.7 Vaccination

Answer 32 · Mark scheme

June 2024 | 8461/2F | Original Q3

Question 3

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.1	gene (for antigen)	allow DNA / allele for antigen ignore DNA / allele unqualified	1	AO3 4.6.2.4

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.2	(pure) antigen(s)		1	AO3 4.6.2.4

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.3	the viruses may cause an infection		1	AO3 4.6.2.4

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.4	any **three** from: • (sun) light • water • ions / minerals / salts • oxygen in the soil • space	ignore sun allow moisture / rain allow a named example allow **two** named ions for **2** marks ignore nutrients / food ignore carbon dioxide	3	AO1 4.7.1.1

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.5	crop plants grow better **or** crop plants have higher yield	ignore reference to competition	1	AO2 4.6.2.4 4.7.5.4 4.7.3.1

4.3.1.7 Vaccination

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.6	any **one** from: • may kill / harm / poison **other** plants • may pollute streams / rivers / soil • may kill / harm / poison humans / animals	ignore it is poisonous unqualified allow may alter taste of (GM) maize allow may reduce biodiversity ignore reference to cost	1	AO2 4.6.2.4 4.7.3.1 4.7.3.6

Total Question 3	8

4.3.1.7 Vaccination

Answer 33 · Mark scheme

June 2025 | 8461/1F | Original Q6

Question 6

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.1	virus		1	AO1 4.3.1.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.2	any **one** from: • (transfer of) droplets / saliva / mucus • sneezes • coughs	ignore other methods of transferring pathogens, unqualified such as touch or direct contact do **not** accept transfer through sexual intercourse	1	AO1 4.3.1.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.3	willow	ignore parts of willow such as bark / leaves	1	AO1 4.3.1.9

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.4	fever **or** (red skin) rash	allow high temperature allow (increased) sweating allow (red) spots / lumps / boils allow red / itchy skin allow cough / sneeze allow runny / blocked nose allow sore throat allow red / watery / sore eyes allow headache ignore flu-like symptoms, unqualified ignore pain unqualified do **not** accept nausea / diarrhoea	1	AO1 4.3.1.2

4.3.1.7 Vaccination

Answer 33 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.5	**few(er)** people (in population) with pathogen / measles / disease (due to vaccination) (so) **less likely** for pathogen / measles / disease to be passed on **or** (so) **less likely** for pathogen / measles / disease to be spread / caught	allow named types of pathogen allow (provides) herd immunity allow **less likely** to come into contact with a person with pathogen / measles / disease ignore (so) spread of disease is reduced allow **2** marks for fewer people with measles, so **less likely** to spread	1 1	AO2 4.3.1.2 4.3.1.7

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.6	(graph reading) = 45 $\frac{45}{100}$ × 240 108	 allow 0.45 × 240 allow for **1** mark an answer of 7 / 7.2 with evidence of having used 3(%) from **Figure 9** **or** allow for **1** mark an answer of 88 / 88.8 / 89 with evidence of having used 37(%) from **Figure 9**	1 1 1	AO2 4.3.1.2

4.3.1.7 Vaccination

Answer 33 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.7		allow answers in terms of numbers of children or likelihood of getting disease		AO3 4.3.1.2
	a lower percentage of vaccinated children have severe measles / infection / disease **or** a higher percentage of unvaccinated children have severe measles / infection / disease **or** vaccination reduces severity of measles / infection / disease	allow converse	1	
	correct use of supporting comparative data from **Figure 9**	allow examples such as (severe disease is) 42% higher (in unvaccinated) **or** 15 times higher (than in vaccinated) **or** allow correct use of raw data used in a comparative way	1	

Total Question 6	11

4.3.1.7 Vaccination

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

4.3.1.7 Vaccination

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.

4.3.1.7 Vaccination

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.

4.3.1.7 Vaccination

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.

4.3.1.7 Vaccination

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

4.3.1.7 Vaccination

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

4.3.1.7 Vaccination

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

4.3.1.7 Vaccination

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

4.3.1.7 Vaccination

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

4.3.1.7 Vaccination

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

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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

4.3.1.7 Vaccination

AQA

GCSE
BIOLOGY
8461/1F

Paper 1 Foundation Tier

Mark scheme

June 2020

Version: 1.0 Final Mark Scheme

jun2084611F/MS

4.3.1.7 Vaccination

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.

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4.3.1.7 Vaccination

Information to Examiners

1. General

The mark scheme for each question shows:

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

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

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

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

2. Emboldening and underlining

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

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

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

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

3. Marking points

3.1 Marking of lists

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

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

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

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

[1 mark]

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

Example 2: Name two planets in the solar system.

[2 marks]

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

3.2 Use of chemical symbols/formulae

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

3.3 Marking procedure for calculations

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

3.4 Interpretation of 'it'

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

3.5 Errors carried forward

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

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

3.6 Phonetic spelling

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

3.7 Brackets

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

3.8 Allow

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

3.9 Ignore

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

3.10 Do <u>not</u> accept

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

4. Level of response marking instructions

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

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

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

Step 1: Determine a level

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

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

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

Step 2: Determine a mark

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

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

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

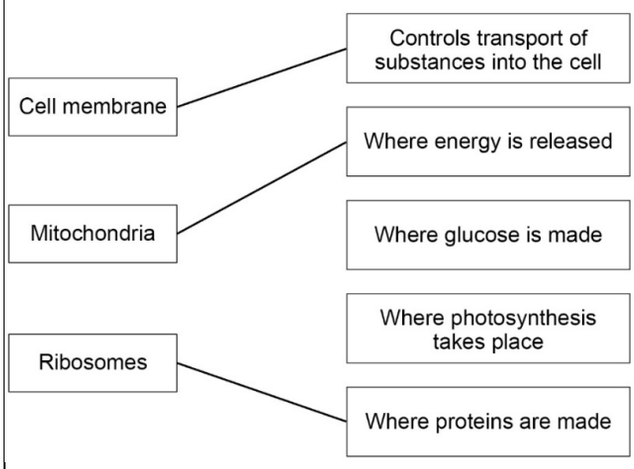
Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do **not** have to cover all of the points mentioned in the indicative content to reach the highest level of the mark scheme.

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

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

4.3.1.7 Vaccination

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

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

4.3.1.7 Vaccination

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**	

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	mitosis		1	AO1 4.1.2.2
02.2	all lines correct = **2** marks 1 or 2 lines correct = **1** mark **Stage of cell cycle** / **What happens during that stage** 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

4.3.1.7 Vaccination

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**	

4.3.1.7 Vaccination

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

4.3.1.7 Vaccination

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**	

4.3.1.7 Vaccination

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

4.3.1.7 Vaccination

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**

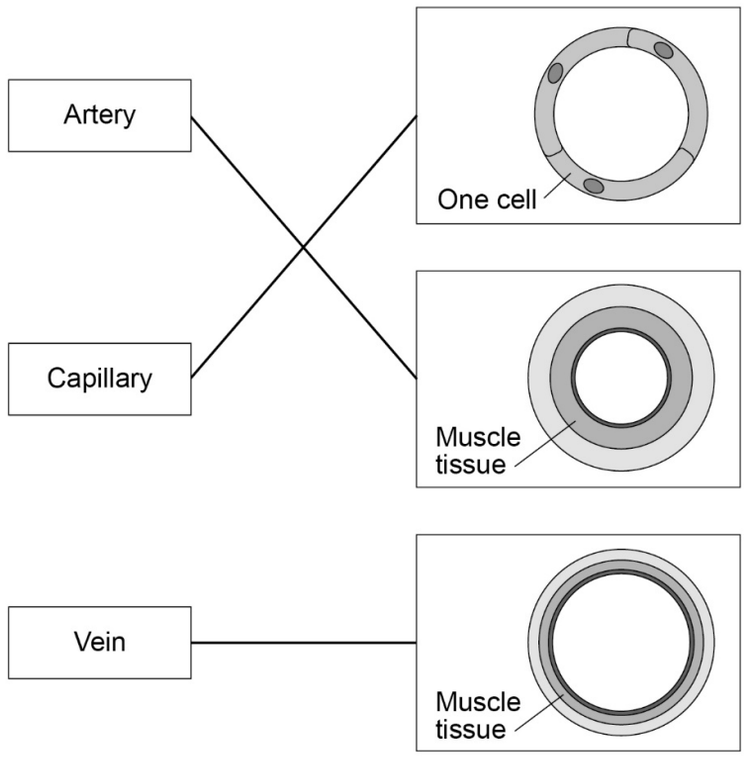
4.3.1.7 Vaccination

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

4.3.1.7 Vaccination

05.9	placebos		1	AO1 4.3.1.9
Total			**14**	

4.3.1.7 Vaccination

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

4.3.1.7 Vaccination

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

4.3.1.7 Vaccination

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**	

4.3.1.7 Vaccination

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

4.3.1.7 Vaccination

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

4.3.1.7 Vaccination

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**	

4.3.1.7 Vaccination

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	

4.3.1.7 Vaccination

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		

4.3.1.7 Vaccination

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**	

4.3.1.7 Vaccination

Answer 27 · Examiner comments November 2020 | 8461/1F | Original Q3

Question 3 (low & standard demand)

Throughout this question, students commonly used the term ‘infection’ as a synonym for bacteria, resulting in many unclear answers. **03.9** differentiated well between lower- and higher-attaining students.

Answer 29 · Examiner comments June 2022 | 8461/1F | Original Q1

Question 1 (Low demand)

01.1 The majority of students correctly identified sexual intercourse as causing the spread of HIV.

01.2 Many students failed to recognise that there were 2 marks available for this question, and only described the overall trend shown in the table, rather than the increase followed by the decrease. Students are encouraged to check the number of marks available for each question and structure their answer accordingly. Nearly 60% of students were awarded the fallback mark on this question, describing an overall decrease.

01.3 Nearly all students who attempted this question answered correctly.

01.4 Just under half of all students gained full marks in this question. Students would benefit from crossing off the letters they have already used in questions such as these, to prevent the same letter being used twice, as was seen on rare occasions.

01.5 Over 70% of students could identify the next stage in testing a vaccine following testing on live animals.

01.6 Over 80% of students knew that drugs that destroy viruses also damage body tissues.

01.7 Less than a third of students gained full marks in this question, and nearly 40% were awarded zero marks.

4.3.1.7 Vaccination

Answer 30 · Examiner comments

June 2023 | 8461/1F | Original Q2

Question 2 (Low demand)

02.1 Nearly all students were able to determine 'pathogens' as being the name given to microorganisms that cause disease.

02.2 Almost 90% of students correctly linked both defences to the part of the body that provided the defence. Students should be reminded that they must not draw more than one line from a box on the left in these questions, as this will not gain credit.

02.3 A pleasing 90% of students knew that a tumour can form when changes to cells cause uncontrolled cell division**.**

02.4 Students have a clear understanding of features of malignant tumours, and indeed only around 4% of students gained zero marks on this question. Almost two thirds of students gained both available marks.

02.5 Over 95% of students gained this mark. A number went on to use data in support of their statements but this was not necessary. Some simply said that Table 2 showed that 'the vaccine had worked', but as the question asked specifically about how the **percentage** of females with HPV had changed, no credit could be given.

02.6 Surprisingly, only around 42% of students could suggest a correct reason for the change in HPV cases from 2010-2016. Many of these students correctly referred to more females, and sometimes more males as well, being vaccinated. Those failing to gain credit however, often simply stated 'vaccination' as the reason but gave no idea as to why the percentage continued to fall over time.

02.7 Nearly 80% of students knew that white blood cells respond to an inactive virus, and gained the mark.

02.8 While the most common incorrect answer was 'antibiotics', it was pleasing to see over 93% of students correctly identifying antibodies as being produced in response to the inactive virus.

02.9 Most credited responses here were around concerns of side effects from the vaccine and this was expressed in many different ways. Around 60% were in fact successful in gaining the mark. Reference to 'anti-vax' parents was seen but unless qualified as to the reason behind refusal to vaccinate it failed to gain a mark. Many students correctly quoted religious or cultural objections although, 'religion' or 'beliefs' on their own were insufficient. The idea that the vaccine might simply not work was commonly credited but answers such as 'parents are scared of the vaccine' or 'it's too expensive' gained no marks.

4.3.1.7 Vaccination

Answer 31 · Examiner comments June 2024 | 8461/1F | Original Q3

Question 3 (low and standard demand)

03.1 85% of students gained at least one mark in this question. As with other linking questions, some students drew more than one line from each box on the left, meaning no marks could be awarded for that box.

03.2 Over 70% of students were awarded the mark for this question, with the most common incorrect answers being 1945 and 1970. A minority of students gave a range of years.

03.3 Students found this question relatively easy to access, with nearly half being awarded full marks. The command word in this question was 'describe' and no credit was given for added explanatory detail, which a number of students provided. A number of students did not acknowledge the period where the number of people remained the same. A number of students who did acknowledge it used inappropriate terminology that was not creditworthy, such as the graph being 'consistent' or references to 'nothing happening' or there being 'no new cases' at the time, which were incorrect. A small number of students described the number of cases rather than the trend and linked the number of cases to the vaccination rate or vaccine introduction, which was not relevant here.

03.4 Nearly 64% of students achieved the mark in this question.

03.5 88% of students answered this question correctly.

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Answer 31 · Examiner comments June 2024 | 8461/1F | Original Q3

03.6 76% of students answered this question correctly.

03.7 Nearly 36% of students gave a creditworthy response to this question, with many articulating the idea of bias. A large proportion of students repeated the stem of question by saying simply 'because he was paid' and many were unable to express their answer succinctly or precisely enough for the mark to be awarded. A variety of different responses were given credit here but those such as 'it was not proper research', 'the person might not have been a scientist' or 'it was not proven' were insufficient.

4.3.1.7 Vaccination

Answer 32 · Examiner comments June 2024 | 8461/2F | Original Q3

Question 3 (low demand)

03.1 A third of students gained this mark.

03.2 Over half of students correctly identified the antigen as the part of the virus made by the yeast cell. The most common incorrect answer seen was ‘nucleus’ or ‘gene’.

03.3 Two thirds of students knew a danger of this vaccine was that it may cause an infection.

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Answer 32 · Examiner comments June 2024 | 8461/2F | Original Q3

03.4 10% of students did not score any marks on this question. The most common answers were sunlight and water, although minerals and space were also seen frequently. Some students gave oxygen as an answer but missed out on the mark when they didn’t specify that the oxygen being competed for is that in the soil. The most frequent uncreditworthy answers were sun unqualified, food, nutrients, soil and carbon dioxide.

03.5 Less than 10% of students gained this mark. The vast majority of answers stated that the glyphosate kills the weeds but not the maize, or that this reduces competition without giving the consequence of this in terms of growth/yield.

03.6 A number of incorrect answers were given for this question, with just over 20% gaining the mark. Many students referred to the maize being killed, despite being told it was resistant and there were many vague comments about other organisms, or the environment being affected – which did not gain credit.

4.3.1.7 Vaccination

Answer 33 · Examiner comments

June 2025 | 8461/1F | Original Q6

Question 6 (standard demand)

06.1 Over 40% of students gained credit for the answer of 'virus' here but there were, equally, many incorrect responses of 'bacteria' (around 45%). Other incorrect suggestions included 'vector', 'antitoxin', 'airborne', 'infectious', and 'fungi' and 'protists'. A surprisingly large number of students (15%) did not give any answer at all.

06.2 Nearly 40% of students correctly stated how measles could be spread, but a higher number (nearly 60%) referred, more vaguely, to 'direct contact' or 'through the air', neither of which gained credit. A few incorrectly believed that measles is a sexually transmitted disease.

06.3 Although 'willow' appeared in answers with reasonable frequency (35%), many students (45%) did not achieve this quite straightforward mark. A wide range of suggestions was evident with 'foxglove' perhaps being the most common incorrect example. A high proportion (over 17%) of students, sadly, did not attempt the question.

06.4 Nearly 70% of students achieved the mark in this question owing to the wide range of symptoms listed in the mark scheme. Occasional incorrect suggestions (25%) were made such as 'vomiting' or 'black spots'. Vague, unqualified responses such as 'temperature', 'feeling unwell' and 'changed skin colour' could not be credited.

06.5 Although students found this question accessible, very few (2%) managed to gain both marks, with 20% gaining 1 mark. Many simply answered in terms of what happens in the body as a result of vaccination. Others focused on 'children' in particular being vaccinated, referring to the ease of pathogen transfer from one child to another due to frequent close contact or to limited appreciation of hygiene. A number of answers included incorrect suggestions such as 'when the vaccinated children become adults they will have gained progressively increased immunity', 'they will be able to pass on their own immunity to their children' or 'they will then be unable to genetically pass measles on to the next generation'. MP1 was gained by a significant number through correctly referring to 'herd immunity' but many could not be awarded the mark by saying that 'fewer people would catch the disease', rather than 'have' it at any one particular time. MP2 required the idea of reduced likelihood, chance or probability of measles being spread and not a simple rewrite of the question in terms of 'therefore spread would be reduced'.

06.6 Several steps were involved in this question. Students were required to select data for unvaccinated children with severe measles and then use this percentage to calculate how many children this represented out of the total of 240. Although 55% of responses gained all 3 marks, common errors were seen. These included:

- calculations which used data for all bars
- incorrect choices from Figure 9
- mistakes in reading from the graph, for example, 55 instead of 45.

4.3.1.7 Vaccination

Answer 33 · Examiner comments

In all these instances, no credit could be awarded. Answers which showed errors in converting 45% to the actual number of children, such as 45÷240 or 240÷45, could only achieve MP1.

06.7 It was pleasing to see that students were not daunted by this question and that many made good attempts at answering. To do so, they had to appreciate exactly what the data in Figure 9 showed; the percentages of vaccinated and unvaccinated children who all had measles, and the degree of severity of these cases. The data did not show information about the likelihood of the children catching measles in the first place. Based on this information, students were required to say why the data supported all children being given a vaccination and to back up their statement with numerical evidence from Figure 9. This evidence did not need to be processed in any way to gain credit. Answers which matched both marks (17%) had to be clearly comparative, had to consider the severity of infection and had to give appropriate and accurate figures in support. Responses such as 'fewer vaccinated children had severe measles shown by there being 7 compared to 108 who had not been vaccinated', or, even more succinctly, '45% of unvaccinated children had a severe infection but only 3% of those who were vaccinated did', both gained full credit. Answers awarded only 1 mark (22%) often did not give comparative data or any data at all, despite the question asking for it. When student responses matched neither marking point (54%), it was usually because they referred to the value of vaccination only as a means of reducing the chance of getting measles in the first place.