AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.3.1.3

Bacterial diseases

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**3**
Available paper years	**2020–2022**

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.

4.3.1.3 Bacterial diseases

Answer 01 · Mark scheme

November 2020 | 8464/B/1H | Original Q4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	any **four** from: • bacterial cell is smaller (than a plant cell) • bacterial cell does **not** have chloroplasts (plant cell does) • bacterial cell does **not** have its DNA / genetic material inside a nucleus (plant cell does) • bacterial cell (may) have plasmids (plant cell does not) • bacterial cell does **not** have mitochondria (plant cell does) • cell wall in bacterial cells is **not** made of cellulose (cell wall in plant cells is) • bacterial cell does **not** have a large / permanent vacuole (plant cell does) • bacterial cell has smaller ribosomes (than plant cells)	allow converse statements 'it' refers to bacteria ignore chlorophyll allow bacterial cell does **not** have a nucleus (plant cell does) allow bacterial cell has DNA / genetic material in a ring / loop (plant cell does not) allow bacterial cell has DNA / genetic material free in cytoplasm do **not** accept idea that bacterial cells do not have ribosomes allow bacterial cell (may) have a flagellum (plant cells do not) allow bacterial cell (may) have a slime capsule (plant cell does not)	4	AO1 4.1.1.1 4.1.1.2

4.3.1.3 Bacterial diseases

Answer 01 · Mark scheme

04.2	any **four** from: • dead / inactive / weakened form of pathogen / bacterium / microorganism is introduced / injected • white blood cells stimulated to produce antibodies • reference to memory cells made or remain • on re-exposure specific / correct antibodies are made (very) quickly • bacteria / pathogens / microorganisms killed and do not produce a large enough population to cause the disease	allow introduce / inject antigen(s) from the pathogen allow dead / inactive / weakened form of *Gonorrhoea* (bacteria) introduced / injected do **not** accept inject Gonorrhoea disease do **not** accept incorrect white blood cell, eg phagocyte allow on re-exposure specific / correct antibodies are produced in large quantities allow bacteria / pathogens / microorganisms killed and do not produce a large enough population to produce toxins	4	AO1 4.3.1.7 AO2 4.3.1.1

4.3.1.3 Bacterial diseases

Answer 01 · Mark scheme

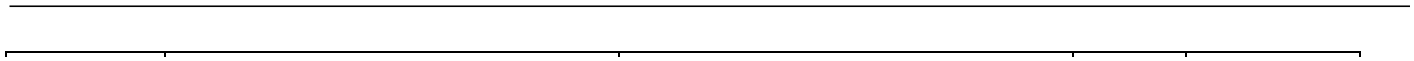
November 2020 | 8464/B/1H | Original Q4

04.3	fewer bacteria / pathogens in chicken / eggs / food (so) fewer bacteria are ingested (by humans) **or** fewer bacteria / pathogens ingested (by humans) (1) (so) fewer toxins produced (1)	ignore references to immunity unqualified allow fewer chickens / eggs will carry the bacteria / pathogens ignore chickens do not get disease / infected allow idea of fewer bacteria being passed on to humans in food allow idea of fewer bacteria being passed on to humans in food (1)	1 1	AO2 4.3.1.3 4.3.1.1
04.4	wash hands before preparing food wash hands after using the toilet	ignore wash hands unqualified allow good food hygiene allow clean areas where a person has been ill allow do not shake hands (with someone who has food poisoning)	1	AO1 4.3.1.1 4.3.1.3
04.5	warmer weather so bacteria reproduce / increase faster	ignore bacteria are killed at low temperatures allow food not cooked properly on barbeques	1	AO3 4.3.1.1 4.3.1.3
Total			**12**	

4.3.1.3 Bacterial diseases

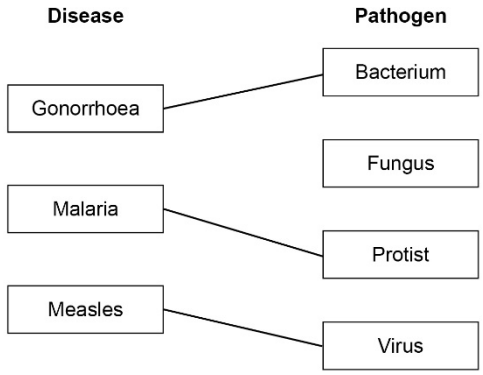
Answer 01 · Mark scheme

November 2020 | 8464/B/1H | Original Q4



4.3.1.3 Bacterial diseases

Answer 02 · Mark scheme November 2021 | 8464/B/1H | Original Q4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	 do **not** accept more than one line from a box on the left		1 1 1	AO1 4.3.1.1 4.3.1.2 4.3.1.3 4.3.1.5
04.2	reduces breeding / reproduction (in mosquitos) (so) fewer mosquitos to bite people **or** (so) fewer mosquitos to pass on pathogen / protist	allow fewer (mosquito) eggs fertilised allow no offspring produced (by sterile mosquitos) allow (so) less likely to be bitten by mosquitos ignore fewer mosquitos to pass on malaria / disease	1 1	AO2 4.3.1.1 4.3.1.5
04.3	electron microscope	ignore microscope unqualified ignore scanning / transmission do **not** accept light microscope	1	AO2 4.1.1.5 4.3.1.2

4.3.1.3 Bacterial diseases

Answer 02 · Mark scheme

04.4	(fungal spore) (16 μm =) 1.6×10^{-5} m **or** (virus) (2.5×10^{-7} m =) 0.25 μm $\frac{1.6 \times 10^{-5}}{2.5 \times 10^{-7}}$ **or** $\frac{16}{0.25}$ (=) 64	 allow $\frac{0.000\,016}{0.000\,000\,25}$ allow incorrect attempt at conversion or not converted value for length correctly substituted allow a correctly calculated value using an incorrectly or not converted value for length allow **1** mark **only** for $\frac{16}{2.5} = 6.4$	1 1 1	AO2 4.1.1.1 4.1.1.5 4.3.1.2 4.3.1.4

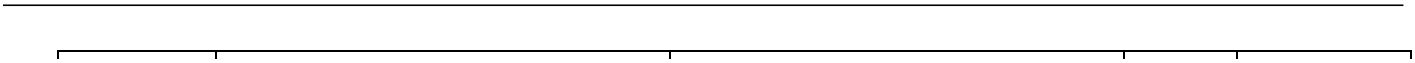
4.3.1.3 Bacterial diseases

04.5		the idea of less is only needed once		
	discolouration in leaves **or** less chlorophyll in leaves	ignore mosaic pattern of leaves unqualified	1	AO1
	(so) reduced photosynthesis	allow less light absorbed	1	AO1
	(so) less glucose produced so less amino acids / proteins / cellulose made	allow (so) less glucose so less energy for synthesis of chemicals **or** allow (so) less glucose for respiration (so) less energy transferred for growth	1	AO2 4.3.1.2 4.4.1.1 4.4.1.2 4.4.1.3 4.4.2.1
Total			**12**	

4.3.1.3 Bacterial diseases

Answer 02 · Mark scheme

November 2021 | 8464/B/1H | Original Q4



4.3.1.3 Bacterial diseases

Answer 03 · Mark scheme

June 2022 | 8464/B/1H | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	both have a cell membrane both have cytoplasm		1 1	AO1 4.1.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	any **one** from: • fever • abdominal / stomach cramps	ignore vomiting / sickness / diarrhoea ignore feel unwell unqualified ignore rashes allow high temperature allow sweating / chills	1	AO1 4.3.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	penicillin	allow phonetic spelling	1	AO2 4.3.1.9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	any **one** from: • only a few bacteria killed so live bacteria continued to reproduce • time delay before antibiotic reached bacteria • time delay before antibiotic could kill bacteria	allow bacteria reproducing when course started allow takes time (for antibiotic) to travel through the body allow takes time (for antibiotic) to work	1	AO3 4.3.1.1 4.3.1.3 4.3.1.8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5	there were fewer toxins in the body than at day 0		1	AO2 4.3.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.6	to reduce / prevent resistant strains / bacteria developing **or** to reduce / prevent antibiotic resistance (in bacteria)	ignore references to bacteria becoming immune allow because they will get better without taking any antibiotics ignore body will fight the infection unqualified allow some infections are caused by viruses allow because they have been told not to by NHS / NICE	1	AO1 4.3.1.8

4.3.1.3 Bacterial diseases

Answer 03 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.7	B		1	AO2 4.2.2.3 4.3.1.7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.8	D		1	AO2 4.2.2.3

Total Question 1		**9**

4.3.1.3 Bacterial diseases

Answer 02 · Examiner comments November 2021 | 8464/B/1H | Original Q4

Question 4 (standard, standard/high and high demand)

This question was about diseases in humans and plants caused by pathogens. More than half of the students scored full marks for linking human diseases to the type of pathogen that each was caused by. Almost half scored 1 mark for saying that releasing sterile mosquitos into the environment would decrease reproduction in mosquitos. Few went on to explain how this would reduce the spread of malaria. As is often the case in questions about communicable diseases, students did not make it clear that reducing the spread of a disease is due to reducing the transfer of pathogens.

A third of students said an electron microscope would be used to view the virus; most just said microscope, which was insufficient. About a third of students knew what type of calculation was required to work out how many times longer the spore was compared to the virus. Few students realised that both measurements had to be converted to the same unit, and errors were seen when unit conversions were attempted. No student gave a full explanation why plants infected with TMV grow slowly. Some said there would be less photosynthesis or that the leaves would have less chlorophyll.

Answer 03 · Examiner comments June 2022 | 8464/B/1H | Original Q1

Question 1 (standard demand)

01.1 66% of students scored both marks for identifying the cell membrane and cytoplasm as structures that are found in both bacterial and animal cells.

01.2 One symptom of salmonella food poisoning was asked for, with students instructed not to refer to vomiting and diarrhoea. 60% of the students were awarded the mark, usually for stomach ache or fever. Many described fever as having a high temperature or sweating, which were allowed.

01.3 64% of students knew that penicillin was the first antibiotic developed. A wide range of phonetic spellings were accepted. The most common incorrect answers were the names of well-known painkillers.

01.4 Fewer than half of the students scored this mark. Most correct responses referred to a time delay before the antibiotics became effective, or started working. A few students said the bacteria would be reproducing or multiplying. There was some confusion with antibodies, and incorrect references to bacteria fighting the antibiotics, or antibiotics fighting bacteria.

01.5 Two-thirds of students knew that a child will start to feel better after taking antibiotics for a few days because there will be fewer toxins in the body. Most other students thought the child had become resistant to the bacteria.

01.6 31% of students scored the mark, usually for saying overuse of antibiotics could result in antibiotic resistance. Alternatively, they scored the mark for the idea that the person would get better without taking any antibiotics, which was allowed.

Quite a lot of students said the patient or the antibiotic would become resistant, which was incorrect. A common mistake was to confuse immunity with resistance.

4.3.1.3 Bacterial diseases

Answer 03 · Examiner comments June 2022 | 8464/B/1H | Original Q1

01.7 A third of students correctly identified the drawing of the white blood cell as the cell that produces antibodies. More than half of the students thought the red blood cell produced antibodies; potentially as a result of students being unfamiliar with drawings of blood components.

01.8 63% of students identified platelets as the part of the blood that starts the clotting process. Few selected plasma as their answer.