AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.1.1.1

Eukaryotes and prokaryotes

Past-paper questions

Tier	**Higher**
Question groups	**5**
Available paper years	**2018–2024**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.1.1.1 Eukaryotes and prokaryotes

Question 01

June 2018 | 8464/B/1H | Original Q1

0 1 This question is about cell structures.

0 1 . 1 Draw **one** line from each cell structure to the type of cell where the structure is found.

[2 marks]

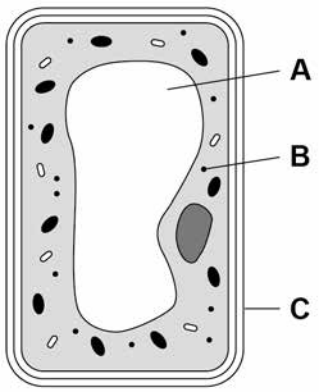
Cell Structure	Type of cell where the structure is found
Nucleus	Prokaryotic cells
Permanent vacuole	Plant cells only
Plasmid	Eukaryotic cells

4.1.1.1 Eukaryotes and prokaryotes

Question 01 · continued

0 1 . 2 **Figure 1** shows a plant cell.

Figure 1



What are the names of structures **A**, **B** and **C**?

[1 mark]

Tick **one** box.

Structure A	Structure B	Structure C	
Chloroplast	Vacuole	Cell wall	☐
Nucleus	Chloroplast	Cell membrane	☐
Vacuole	Mitochondrion	Cell membrane	☐
Vacuole	Ribosome	Cell wall	☐

Question 1 continues on the next page

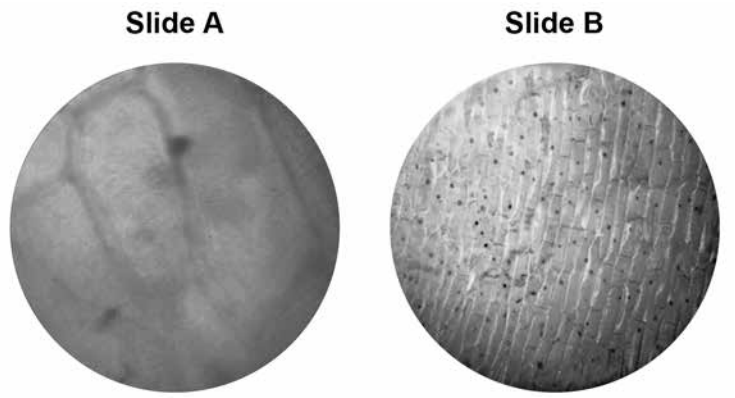
4.1.1.1 Eukaryotes and prokaryotes

Question 01 · continued

A student observed slides of onion cells using a microscope.

Figure 2 shows two of the slides the student observed.

Figure 2



The cells on the slides are **not** clear to see.

0 1 . 3 Describe how the student should adjust the microscope to see the cells on **Slide A** more clearly.

[1 mark]

0 1 . 4 Describe how the student should adjust the microscope to see the cells on **Slide B** more clearly.

[2 marks]

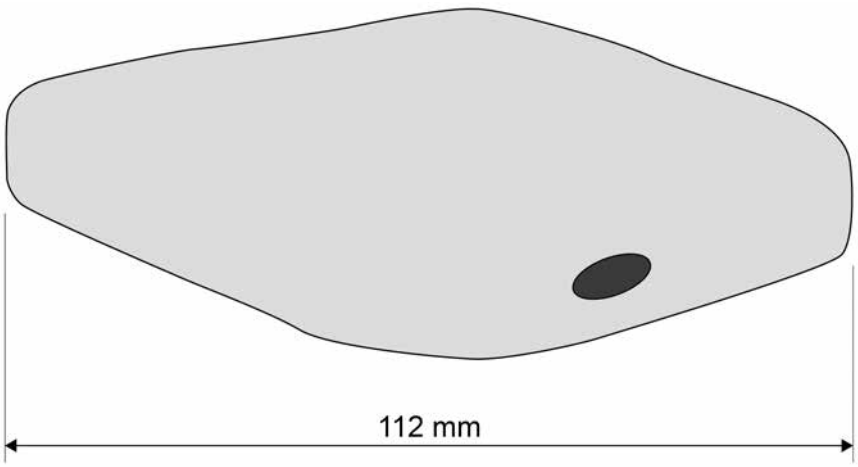
4.1.1.1 Eukaryotes and prokaryotes

Question 01 · continued

0 1 . 5 The student made the necessary adjustments to get a clear image.

Figure 3 shows the student's drawing of one of the cells.

Figure 3



The real length of the cell was 280 micrometres (µm).

Calculate the magnification of the drawing.

[3 marks]

Magnification = × _____

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4.1.1.1 Eukaryotes and prokaryotes

Question 02

June 2019 | 8464/B/1H | Original Q4

0 4 Pathogens are microorganisms that cause infectious diseases.

0 4 . 1 What type of pathogen causes malaria?

[1 mark]

Tick (✓) **one** box.

- Bacterium ☐
- Fungus ☐
- Protist ☐
- Virus ☐

0 4 . 2 Give **two** methods used to prevent people catching malaria.

Give a reason why each method works.

[4 marks]

Method 1 _____

_____

Reason _____

_____

_____

Method 2 _____

_____

Reason _____

_____

_____

4.1.1.1 Eukaryotes and prokaryotes

Question 02 · continued

0 4 . 3 Describe **two** differences between a bacterial cell and a eukaryotic cell.

[2 marks]

1 _____

_____

_____

2 _____

_____

_____

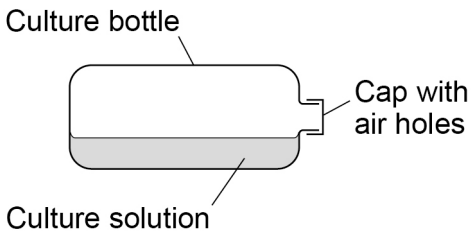
A scientist investigated the population growth of bacteria in a culture solution.

At the start of the investigation the culture solution contained all the nutrients the bacteria needed.

The scientist determined the number of living bacterial cells in the solution every hour over two days.

Figure 5 shows the apparatus used.

Figure 5



0 4 . 4 Describe why there are air holes in the cap of the culture bottle.

[1 mark]

_____

_____

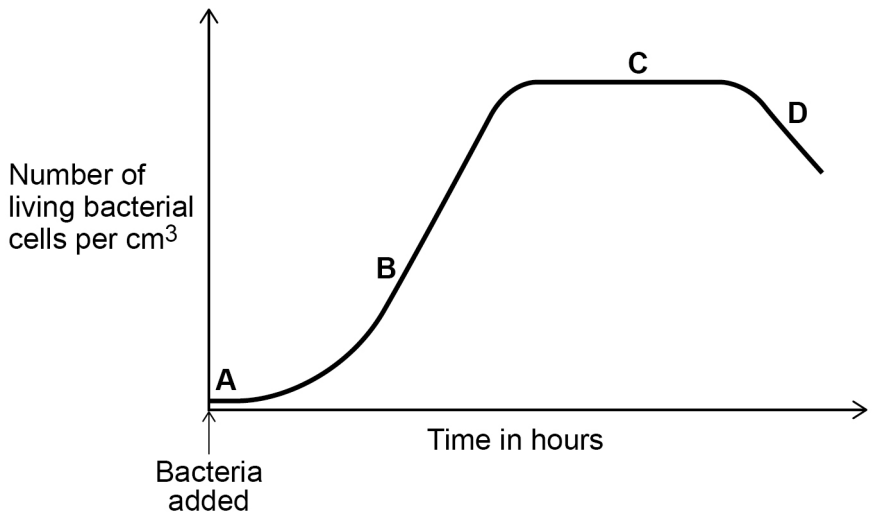
Question 4 continues on the next page

4.1.1.1 Eukaryotes and prokaryotes

Question 02 · continued

Figure 6 shows the scientist's results.

Figure 6



0 4 . 5 Give **one** reason for what is happening to the number of bacteria at each of the stages.

[4 marks]

Stage **A** _____

Stage **B** _____

Stage **C** _____

Stage **D** _____

4.1.1.1 Eukaryotes and prokaryotes

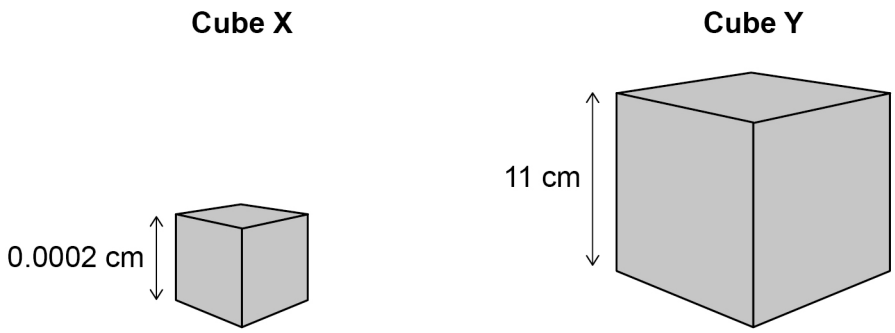
Question 02 · continued

0 4 . 6 **Figure 7** shows two cubes.

Cube **X** represents a bacterial cell.

Cube **Y** represents a small multicellular organism.

Figure 7



A bacterial cell can absorb all the nutrients it needs by diffusion through its outer surface.

Explain why a multicellular organism **cannot** absorb all the nutrients it needs by diffusion through its outer surface.

You **must** include calculations in your answer.

Use **Figure 7**.

[5 marks]

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4.1.1.1 Eukaryotes and prokaryotes

Question 03

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

0 1 Bacteria can cause a variety of diseases in humans.

0 1 . 1 What are **two** similarities between a bacterial cell and an animal cell?

[2 marks]

Tick (✓) **two** boxes.

- Both have a cell membrane. ☐
- Both have a cell wall. ☐
- Both have a nucleus. ☐
- Both have cytoplasm. ☐
- Both have plasmids. ☐

0 1 . 2 Salmonella food poisoning is caused by bacteria in food.

Give **one** symptom of salmonella food poisoning.

Do **not** refer to vomiting or diarrhoea in your answer.

[1 mark]

_____

_____

Question 1 continues on the next page

4.1.1.1 Eukaryotes and prokaryotes

Question 03 · continued

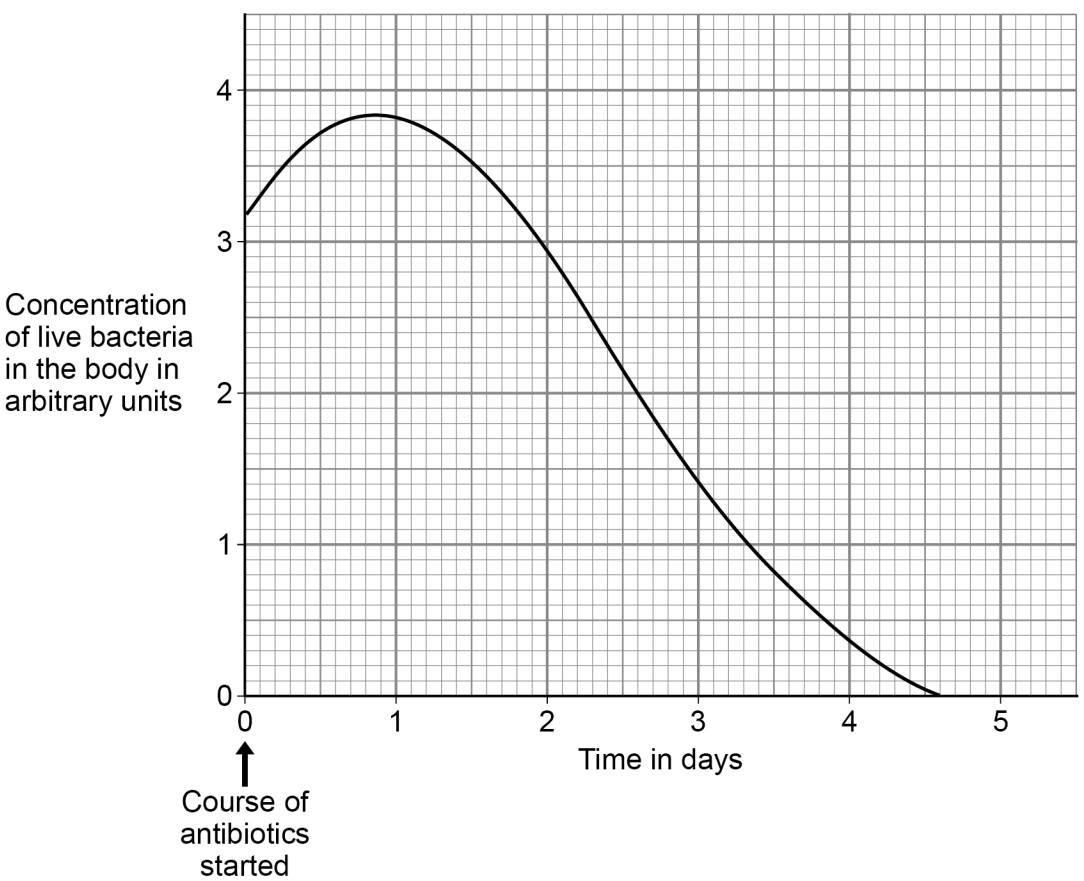
0 1 . 3 What is the name of the first antibiotic developed?

[1 mark]

A child with a severe bacterial infection was given a course of antibiotics.

Figure 1 shows how the concentration of live bacteria in the child's body changed when taking the course of antibiotics.

Figure 1



4.1.1.1 Eukaryotes and prokaryotes

Question 03 · continued

0 1 . 4 The concentration of live bacteria in the body continued to increase after starting the course of antibiotics.

Suggest **one** reason why.

[1 mark]

0 1 . 5 After 3 days of taking the antibiotic:

- the child felt better
- there were still bacteria in the child's body.

Why did the child feel better?

[1 mark]

Tick (✓) **one** box.

Bacteria had become immune to the antibiotic. ☐

The child had become resistant to the bacteria. ☐

There were fewer toxins in the body than at day 0 ☐

0 1 . 6 Suggest why doctors do **not** give antibiotics to patients with minor infections.

[1 mark]

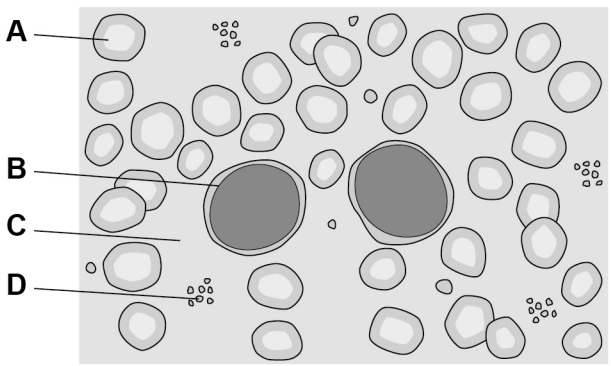
Question 1 continues on the next page

4.1.1.1 Eukaryotes and prokaryotes

Question 03 · continued

Figure 2 shows blood viewed using a microscope.

Figure 2



0 1 . 7 A vaccine will stimulate the production of antibodies.

Which part of the blood in **Figure 2** produces antibodies?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 1 . 8 Which part of the blood in **Figure 2** starts the clotting process?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

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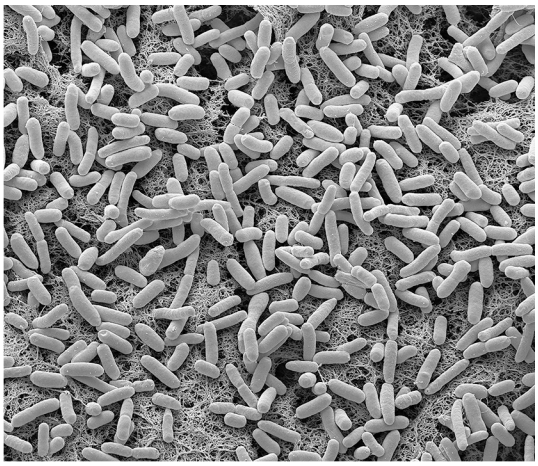
4.1.1.1 Eukaryotes and prokaryotes

Question 04

0 5 This question is about microscopy.

0 5 . 1 **Figure 3** shows bacteria viewed using a microscope.

Figure 3



What type of microscope was used to view the bacteria in **Figure 3**?

Give a reason for your answer.

[1 mark]

Type of microscope _____

Reason _____

_____

_____

Question 5 continues on the next page

4.1.1.1 Eukaryotes and prokaryotes

Question 04 · continued

0 5 . 2 Bacterial cells are prokaryotic cells.

Give **three** ways that a prokaryotic cell is different from a eukaryotic cell.

[3 marks]

1 _____

_____

2 _____

_____

3 _____

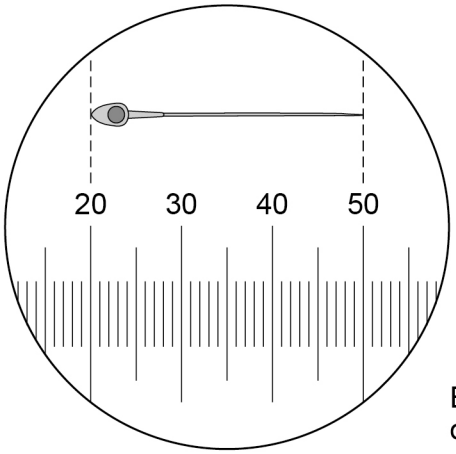
_____

4.1.1.1 Eukaryotes and prokaryotes

Question 04 · continued

0 5 . 3 **Figure 4** shows a special slide used to determine the size of a cell viewed using a microscope.

Figure 4



Each small division on the scale is 1.5 µm

Calculate the magnification of the cell shown in **Figure 4**.

[5 marks]

Magnification = ×

9

4.1.1.1 Eukaryotes and prokaryotes

Question 05

0 2 Potatoes are a food crop.

0 2 . 1 Potato plants are classified as eukaryota.

What type of classification group is eukaryota?

[1 mark]

Tick (✓) **one** box.

Class ☐

Domain ☐

Kingdom ☐

Phylum ☐

0 2 . 2 Potato plants can reproduce by asexual reproduction.

Which statement is true for asexual reproduction?

[1 mark]

Tick (✓) **one** box.

Meiosis occurs. ☐

Offspring are genetically identical. ☐

Pollen and egg cells are produced. ☐

Question 2 continues on the next page

4.1.1.1 Eukaryotes and prokaryotes

0 2 . 3 Flowers of potato plants contain gametes for sexual reproduction.

How is a gamete different from other cells in a potato plant?

[1 mark]

Tick (✓) **one** box.

A gamete contains one-quarter of the number of chromosomes. ☐

A gamete contains half of the number of chromosomes. ☐

A gamete contains double the number of chromosomes. ☐

0 2 . 4 Plants in the same genus as potatoes have been studied by scientists.

Describe **one** way a new plant species could be identified as being in the same genus as potatoes.

[1 mark]

4.1.1.1 Eukaryotes and prokaryotes

Question 05 · continued

0 2 . 5 Scientists have collected and stored seeds from species in the same genus as potatoes.

In the future, these seeds may be used for genetic modification of potato plants.

Genetically modified potato plants could help supply food to the human population as the climate changes.

Explain why genetic modification of crop plants may be important for the human population to survive climate change.

[6 marks]

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