AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.3.1.8

Antibiotics and painkillers

Past-paper questions

Tier	**Foundation**
Question groups	**9**
Available paper years	**2018–2025**

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.

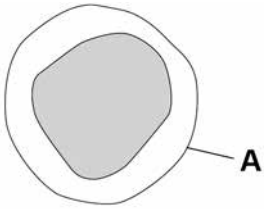
4.3.1.8 Antibiotics and painkillers

Question 01

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

0 1 **Figure 1** shows one type of white blood cell.

Figure 1



0 1 . 1 What is structure **A**?

[1 mark]

Tick **one** box.

- Cell membrane ☐
- Cell wall ☐
- Cytoplasm ☐
- Nucleus ☐

0 1 . 2 White blood cells help to defend the body against pathogens.

How do the white blood cells do this?

[3 marks]

Tick **three** boxes.

- Clone pathogens ☐
- Engulf pathogens ☐
- Produce antibiotics ☐
- Produce antibodies ☐
- Produce antitoxins ☐
- Produce toxins ☐

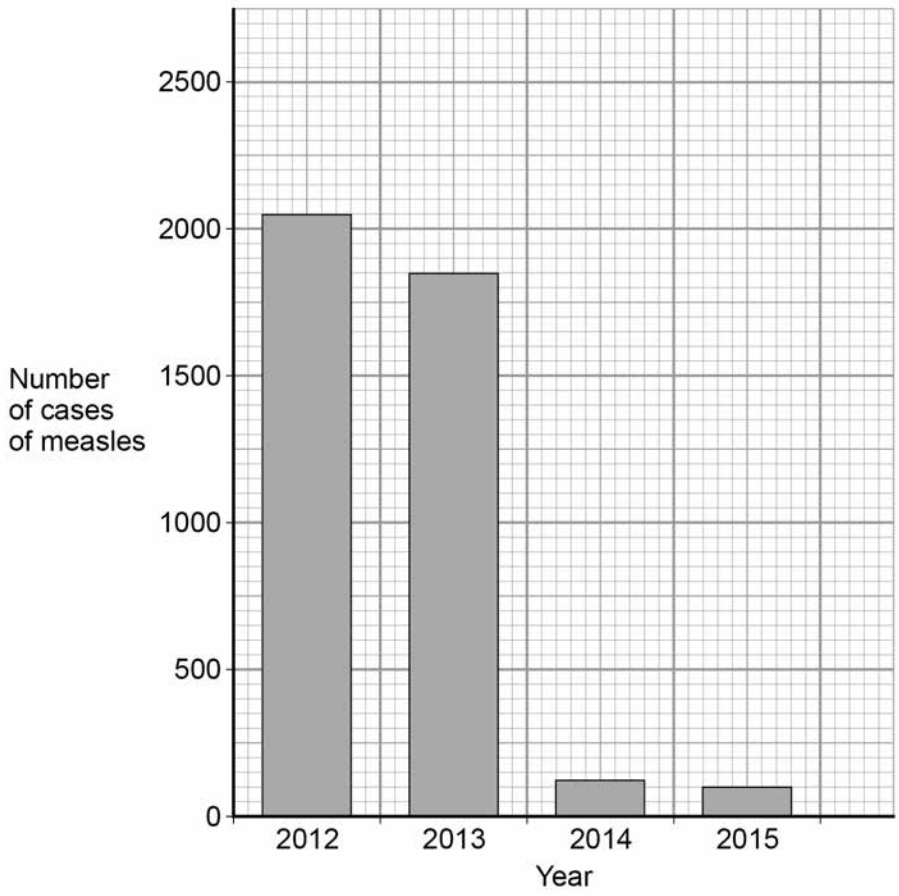
4.3.1.8 Antibiotics and painkillers

Question 01 · continued June 2018 | 8464/B/1F | Original Q1

Measles is a serious disease. A person can die from measles.

Figure 2 shows the number of cases of measles in England and Wales between 2012 and 2015

Figure 2



0 1 . 3 Use **Figure 2** to calculate the decrease in the number of cases of measles between 2012 and 2015

[2 marks]

Answer = _____ cases

0 1 . 4 Suggest **one** reason for the decrease in the number of cases of measles between 2012 and 2015

[1 mark]

4.3.1.8 Antibiotics and painkillers

Question 01 · continued

0 1 . 5 Antibiotics **cannot** be used to treat measles.

Suggest why.

[1 mark]

0 1 . 6 Gonorrhoea is a disease caused by a bacterium.

Gonorrhoea **can** be treated with antibiotics.

Give **one** other way to control the spread of gonorrhoea.

[1 mark]

A scientist investigated how effective different antibiotics were at killing gonorrhoea bacteria.

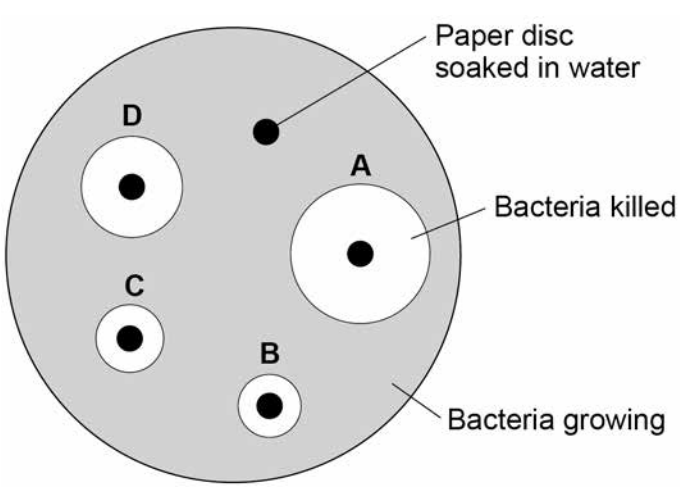
This is the method used.

1. Grow gonorrhoea bacteria on agar in a Petri dish.
2. Place one paper disc soaked in water onto the agar.
3. Place four other paper discs, each soaked in a different antibiotic, **A**, **B**, **C**, and **D**, onto the agar.
4. Use the same sized paper discs and the same concentration of each antibiotic.
5. Incubate the Petri dish for 3 days.

Figure 3 shows the scientist's results.

A clear area around the disc means the antibiotic has killed the bacteria.

Figure 3



4.3.1.8 Antibiotics and painkillers

Question 01 · continued

0 1 . 7 Give **one** control variable the scientist used.

[1 mark]

0 1 . 8 Suggest why **one** disc was soaked in water.

[1 mark]

0 1 . 9 Which antibiotic in **Figure 3** would be the best to treat gonorrhoea?

Give a reason for your answer.

[2 marks]

Antibiotic

Reason

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4.3.1.8 Antibiotics and painkillers

Question 02

June 2018 | 8464/B/2F | Original Q7

0 7 *Pseudomonas* bacteria cause infections in hospital patients.

A new strain of *Pseudomonas* bacteria has evolved. This new strain can only be killed by one antibiotic called fluroquinolone.

Scientists want to prevent the new strain of *Pseudomonas* from spreading in the human population.

Explain the advice doctors should be given to prevent the spread of the new strain.

[6 marks]

4.3.1.8 Antibiotics and painkillers

Question 03

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

0 4 Pathogens cause infectious diseases.

0 4 . 1 Draw **one** line from each disease to the type of pathogen that causes the disease.

[2 marks]

Disease	Type of pathogen
	Bacterium
Gonorrhoea	Fungus
Measles	Protist
	Virus

The body defends itself against pathogens in different ways.

0 4 . 2 Give **two** ways that the body prevents pathogens entering the body.

[2 marks]

1 _____

_____

2 _____

_____

4.3.1.8 Antibiotics and painkillers

Question 03 · continued

0 4 . 3 If pathogens do enter the body the immune system tries to destroy the pathogens.

Describe how the immune system defends the body against disease.

[6 marks]

Question 4 continues on the next page

4.3.1.8 Antibiotics and painkillers

Question 03 · continued

0 4 . 4 Give **one** reason why antibiotics cannot be used to treat HIV infections.

[1 mark]

0 4 . 5 Give **two** ways to prevent the spread of HIV.

[2 marks]

1

2

0 4 . 6 Some people with a HIV infection develop AIDS.

Some people with AIDS may die from a different type of infection, such as a chest infection.

Why do people with AIDS die from a different type of infection?

[1 mark]

Tick (✓) **one** box.

HIV damages the immune system. ☐

Pathogens enter the body more easily. ☐

People with AIDS are immune to HIV. ☐

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4.3.1.8 Antibiotics and painkillers

Question 04

November 2021 | 8464/B/1F | Original Q2

0 2 Antibiotics are used to treat bacterial infections.

0 2 . 1 Which substance is used as an antibiotic?

[1 mark]

Tick (✓) **one** box.

Aspirin ☐

Digitalis ☐

Penicillin ☐

Gonorrhoea and chlamydia are two sexually transmitted infections.

Gonorrhoea and chlamydia infections can be treated with antibiotics.

0 2 . 2 Give **one** symptom of gonorrhoea.

[1 mark]

4.3.1.8 Antibiotics and painkillers

Question 04 · continued

A scientist investigated which antibiotics were most effective at treating gonorrhoea and chlamydia.

This is the method used.

1. Grow gonorrhoea bacteria in a Petri dish.
2. Prepare four different antibiotic solutions, **A**, **B**, **C** and **D**, of the same concentration.
3. Cut four filter paper discs to the same size.
4. Soak each paper disc in a different antibiotic solution.
5. Put the four paper discs into the Petri dish.
6. Repeat steps 3 to 5 using a Petri dish with chlamydia bacteria growing in it.
7. Keep both Petri dishes at 25 °C for 3 days.

0 2 . 3 Give **two** control variables used in this investigation.

[2 marks]

1 _____

_____

2 _____

_____

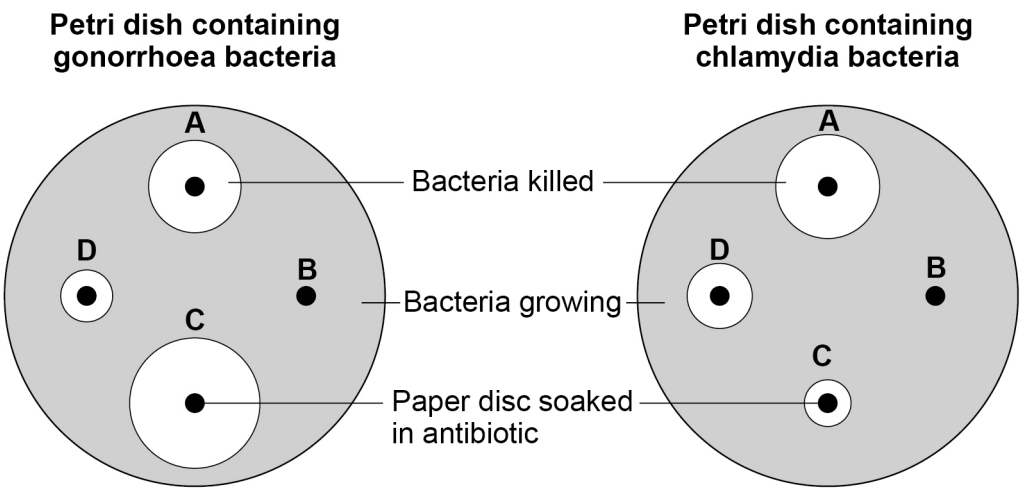
Question 2 continues on the next page

Question 04 · continued

Figure 2 shows the results.

A clear area around a paper disc is where the antibiotic has killed the bacteria.

Figure 2



0 2 . 4 Which antibiotic did **not** kill either type of bacterium?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 2 . 5 Which antibiotic would be the most effective to treat a person with a **gonorrhoea** infection?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

4.3.1.8 Antibiotics and painkillers

Question 04 · continued

0 2 . 6 Which antibiotic would be the most effective to treat a person who had both gonorrhoea **and** chlamydia infections?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 2 . 7 Antibiotics **cannot** be used to treat HIV infections.

Suggest **one** reason why.

[1 mark]

Fungi can cause an infection of the fingernails and toenails.

Fungal nail infections can spread from one person to another person.

0 2 . 8 Some people go to nail salons to have their nails shaped and painted.

Suggest **one** way workers in nail salons can reduce the risk of infections being spread.

[1 mark]

0 2 . 9 Suggest **one** reason why fungal infection of toenails is more common than fungal infection of fingernails.

[1 mark]

10

4.3.1.8 Antibiotics and painkillers

Question 05

June 2022 | 8464/B/1F | Original Q5

0 5 Bacteria can cause a variety of diseases in humans.

0 5 . 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 5 . 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 5 continues on the next page

4.3.1.8 Antibiotics and painkillers

Question 05 · continued

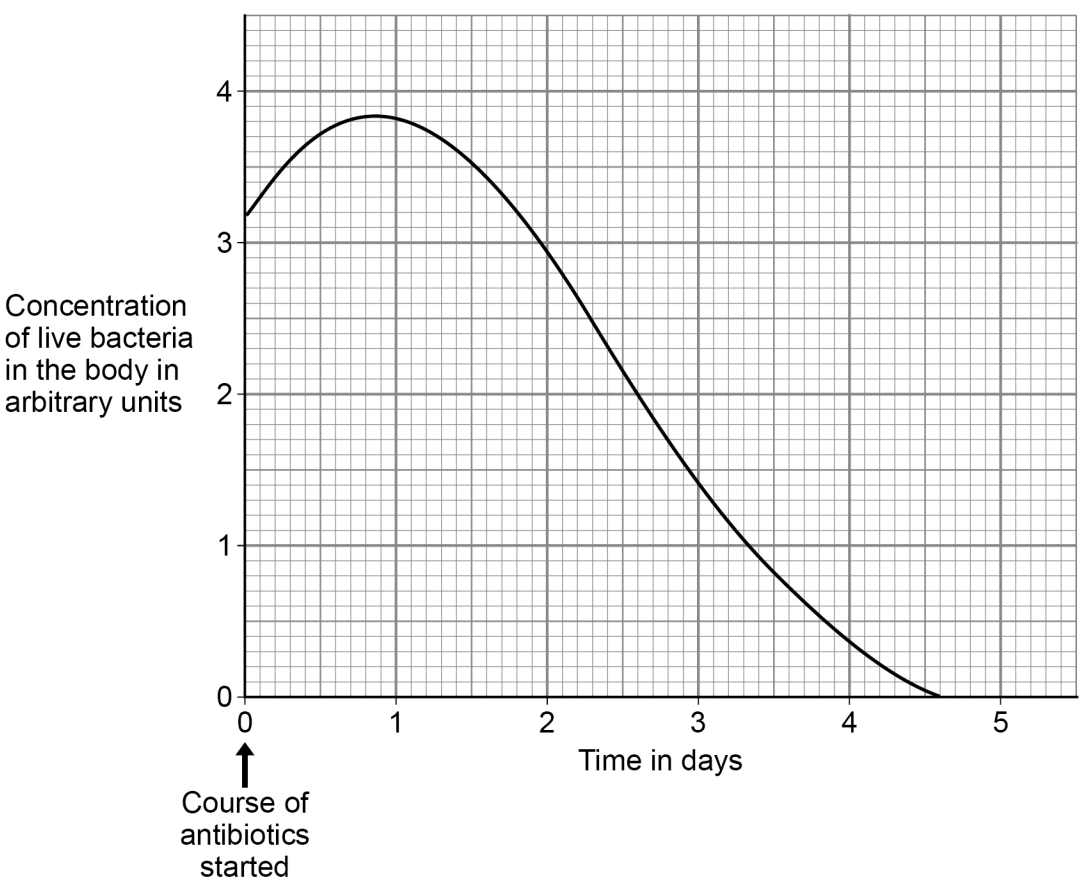
0 5 . 3 What is the name of the first antibiotic developed?

[1 mark]

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

Figure 7 shows how the concentration of live bacteria in the child's body changed when taking the course of antibiotics.

Figure 7



4.3.1.8 Antibiotics and painkillers

Question 05 · continued

0 5 . 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 5 . 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 5 . 6 Suggest why doctors do **not** give antibiotics to patients with minor infections.

[1 mark]

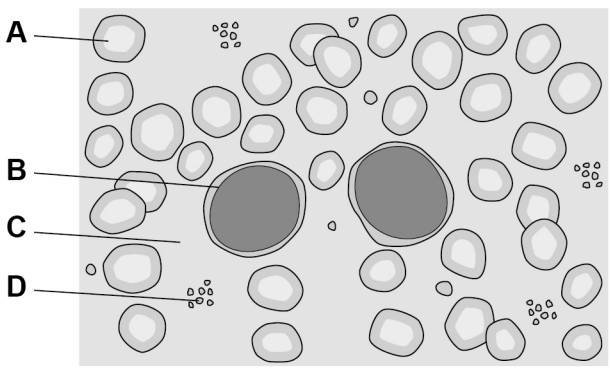
Question 5 continues on the next page

4.3.1.8 Antibiotics and painkillers

Question 05 · continued

Figure 8 shows blood viewed using a microscope.

Figure 8



0 5 . 7 A vaccine will stimulate the production of antibodies.

Which part of the blood in **Figure 8** produces antibodies?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 5 . 8 Which part of the blood in **Figure 8** starts the clotting process?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

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4.3.1.8 Antibiotics and painkillers

Question 06

June 2023 | 8464/B/2F | Original Q7

0 7 It is estimated that 99.9% of all species that have ever existed are now extinct.

0 7 . 1 Why is the percentage of species that are extinct only an estimate?

[1 mark]

Tick (✓) **one** box.

- All individuals of one species have the same genes. ☐
- Extinction is always caused by humans. ☐
- Humans have not found evidence of every species. ☐

0 7 . 2 What evidence is used to study species that have become extinct?

[1 mark]

4.3.1.8 Antibiotics and painkillers

Question 06 · continued

0 7 . 3 A bacterium called *Clostridioides difficile* (*C. difficile*) can infect the human digestive system.

C. difficile can multiply and produce toxins. The toxins cause diarrhoea.

Doctors are concerned that new strains of *C. difficile* may evolve. Antibiotics may **not** be able to kill these new strains.

Explain how the evolution of antibiotic resistant *C. difficile* can be slowed down.

[6 marks]

8

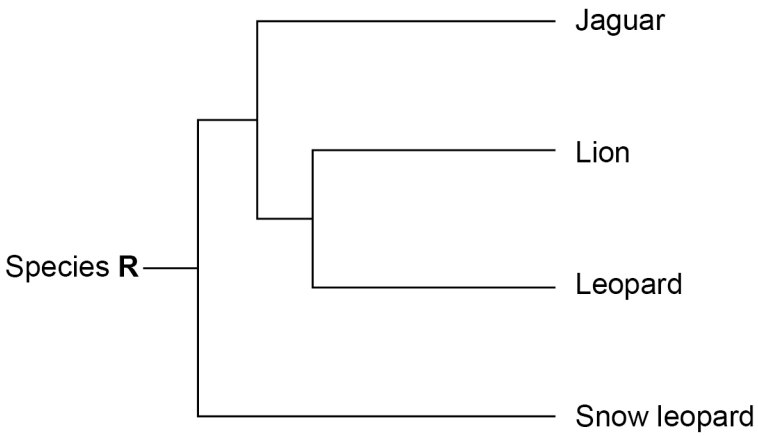
4.3.1.8 Antibiotics and painkillers

Question 07

June 2024 | 8464/B/2F | Original Q4

0 4 **Figure 8** shows an evolutionary tree.

Figure 8



0 4 . 1 Which species in **Figure 8** is most closely related to lions?

[1 mark]

Tick (✓) **one** box.

Jaguar ☐

Leopard ☐

Snow leopard ☐

0 4 . 2 Tigers are more closely related to snow leopards than to jaguars.

Draw a line on **Figure 8** to show the evolution of tigers.

Label the line 'Tiger'.

[1 mark]

4.3.1.8 Antibiotics and painkillers

Question 07 · continued

0 4 . 3 What is represented by species **R** on **Figure 8**?

[1 mark]

Tick (✓) **one** box.

A species recently evolved from jaguars. ☐

A species that may evolve in the future. ☐

A species that the other species evolved from. ☐

0 4 . 4 Complete the sentence.

Choose the answer from the box.

[1 mark]

classification	**homeostasis**	**natural selection**

Evolution occurs by the process of _____.

0 4 . 5 Species can become extinct.

Give **two** possible causes of extinction.

[2 marks]

1 _____

_____

2 _____

_____

Question 4 continues on the next page

Question 07 · continued

0 4 . 6 Fossils are used to study the evolution of some species.

Suggest **one** reason why fossils are used to study evolution.

[1 mark]

Some bacteria have evolved to be resistant to penicillin.

Penicillin is an antibiotic.

0 4 . 7 How has the process of evolution produced bacteria that are resistant to penicillin?

Write the stages, **A**, **B**, **C**, **D** and **E** in the correct order.

The first stage has been completed for you.

[3 marks]

A The bacteria with mutations are more likely to survive.

B The population of bacteria is exposed to penicillin.

C The mutation for resistance to penicillin is passed on to offspring.

D Variation in the population of bacteria is caused by mutation.

E The surviving bacteria reproduce.

D → _____ → _____ → _____ → _____

4.3.1.8 Antibiotics and painkillers

Question 07 · continued

0 4 . 8 New antibiotics are **not** likely to control the spread of bacteria that are resistant to antibiotics.

What are **two** reasons why?

[2 marks]

Tick (✓) **two** boxes.

- Antibiotics kill all types of bacteria. ☐
- Antibiotic resistant bacteria will continue to evolve. ☐
- Bacteria reproduce very rapidly. ☐
- New antibiotics are cheap to produce. ☐
- Testing new antibiotics is quick. ☐

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Turn over for the next question

4.3.1.8 Antibiotics and painkillers

Question 08

June 2025 | 8464/B/1F | Original Q6

0 6 Chickenpox is an infectious disease that affects young children.

0 6 . 1 One symptom of chickenpox is small blisters on the skin.

Suggest **one** way chickenpox spreads from an infected person to other people.

[1 mark]

0 6 . 2 Chickenpox is caused by a type of pathogen that **cannot** be treated with antibiotics.

Give the reason why chickenpox **cannot** be treated with antibiotics.

[1 mark]

A vaccine that could be used to protect against chickenpox has been produced.

0 6 . 3 What does a vaccine contain that causes a person to become immune to a disease?

[1 mark]

0 6 . 4 Give **three** reasons why a new vaccine must be tested.

[3 marks]

1

2

3

4.3.1.8 Antibiotics and painkillers

Question 08 · continued

0 6 . 5 Explain how a vaccine for chickenpox gives immunity against the disease.

You should refer to how the body responds to:

- the vaccine
- chickenpox pathogens that enter the body after vaccination.

[6 marks]

Extra Space

12

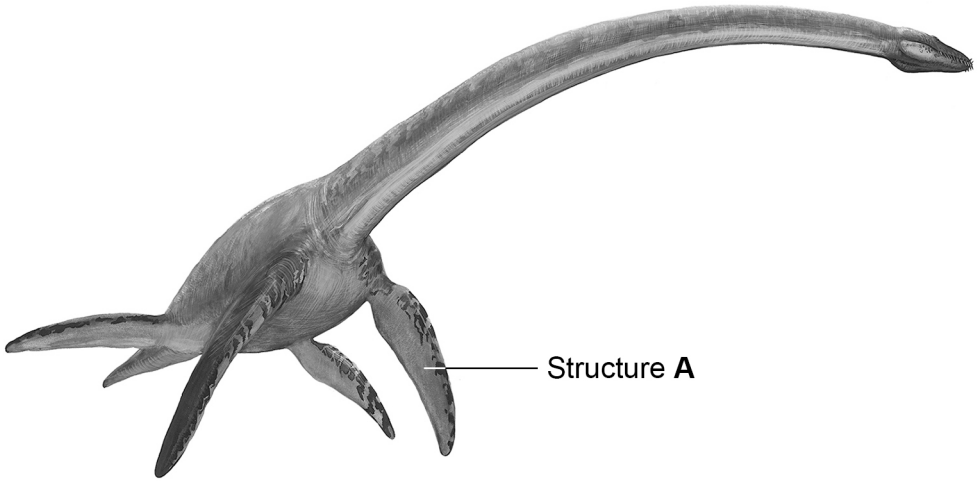
4.3.1.8 Antibiotics and painkillers

Question 09

0 4 Plesiosaurs are extinct animals that lived in the ocean.

Figure 5 shows what scientists think a living plesiosaur may have looked like.

Figure 5



0 4 . 1 Scientists think that the plesiosaur had smooth skin.

Suggest why the scientists **cannot** be certain what the skin of the plesiosaur was like.

[1 mark]

0 4 . 2 Explain how structure **A** in **Figure 5** helped the plesiosaur survive in the ocean.

[2 marks]

4.3.1.8 Antibiotics and painkillers

Question 09 · continued

0 4 . 3 Plesiosaurs may have moved rapidly upwards to hold their heads above the water surface to search for prey.

What type of adaptation was the rapid upwards movement?

[1 mark]

Tick (✓) **one** box.

Behavioural ☐

Chemical ☐

Structural ☐

Question 4 continues on the next page

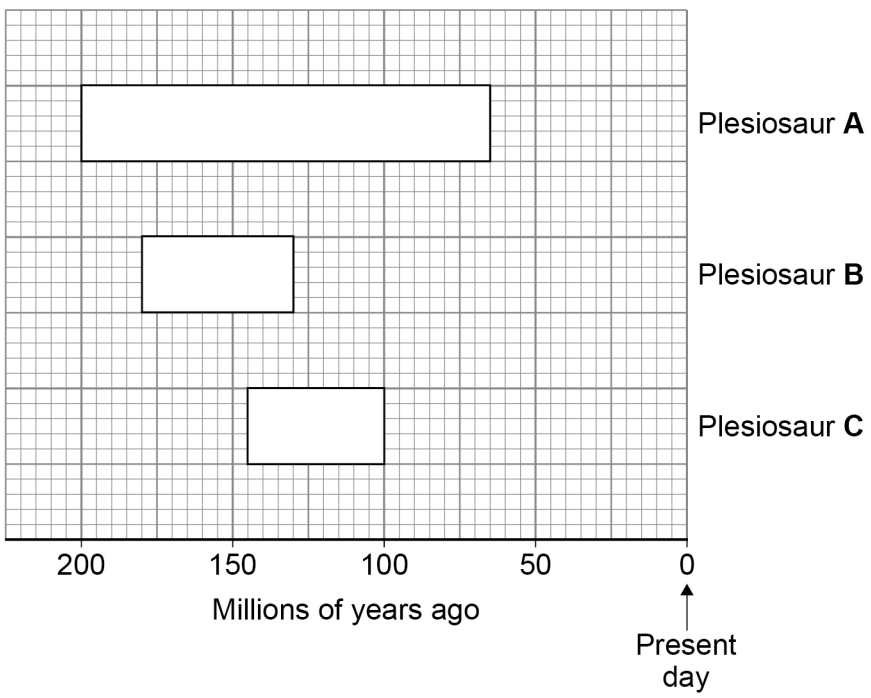
4.3.1.8 Antibiotics and painkillers

Question 09 · continued

Scientists use fossils to estimate when different types of plesiosaur existed.

Figure 6 shows when three types of plesiosaur existed.

Figure 6



0 4 . 4 When did plesiosaur **A** first evolve?

Use **Figure 6**.

[1 mark]

_____ million years ago

0 4 . 5 Determine how many million years plesiosaur **B** existed for.

Use **Figure 6**.

[2 marks]

_____

_____

_____

Time = _____ million years

4.3.1.8 Antibiotics and painkillers

Question 09 · continued

0 4 . 6 The exact year of extinction of all plesiosaur species can only be estimated.

Which are **two** reasons why?

[2 marks]

Tick (✓) **two** boxes.

- All plesiosaurs will have formed fossils. ☐
- Not all plesiosaur fossils have been discovered. ☐
- Plesiosaur bones do not decay. ☐
- Plesiosaurs had many predators. ☐
- Some plesiosaur fossils will have been destroyed. ☐

0 4 . 7 What evidence from **Figure 6** shows that plesiosaur **C** might have evolved from plesiosaur **B**?

[1 mark]

Tick (✓) **one** box.

- Plesiosaur **B** and plesiosaur **C** did not exist at the same time. ☐
- Plesiosaur **B** existed before plesiosaur **C**. ☐
- Plesiosaur **B** became extinct more recently than plesiosaur **C**. ☐

Question 4 continues on the next page

4.3.1.8 Antibiotics and painkillers

Question 09 · continued

0 4 . 8 Evolution can be studied using evidence from:

- fossils
- antibiotic-resistant bacteria.

Suggest **two** reasons why it is easier to study evolution in bacteria than to study evolution using fossils.

[2 marks]

1 _____

_____

2 _____

_____

0 4 . 9 Give **one** reason why doctors are concerned about antibiotic-resistant bacteria.

[1 mark]

_____

_____

13