

GCSE Combined Science: Trilogy

Worksheet: Antibiotics and painkillers

TIME 30 min	TOTAL 28 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Antibiotics and painkillers

NAME	CLASS	DATE
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

01

Antibiotics and painkillers are both used to treat illness, but they work in very different ways.

01.1

Which statement is correct?

Tick (✓) **one** box.

- Painkillers kill the bacteria that cause an infection.
- Antibiotics relieve pain but do not kill bacteria.
- An antibiotic is effective against a specific type, or a few types, of bacteria.
- One antibiotic is equally effective against every type of bacterium.

[1 mark]

01.2

Give **one** example of a painkiller.

[1 mark]

0 1 . 3

Explain why doctors must know which specific bacterium is causing an infection before choosing the best antibiotic.

[2 marks]

0 2

Doctors use different types of medicine to treat diseases.

0 2 . 1

What do antibiotics do?

Tick (✓) **one** box.

Kill bacteria inside the body

Kill viruses inside the body

Make the body produce antibodies

Reduce pain but do not kill pathogens

☐
☐
☐
☐

[1 mark]

0 2 . 2

Name **one** antibiotic.

[1 mark]

0 2 . 3

Many people with a cold take painkillers, such as paracetamol.
Explain why painkillers do not cure a cold.

[2 marks]

0 2 . 4

Give the reason why doctors do not prescribe antibiotics for a cold.

.....

.....

[1 mark]

0 3

Bacteria from a patient’s infected wound were grown on an agar plate. Paper discs soaked in four different antibiotics, A, B, C and D, were placed on the agar. After incubation, the diameter of the clear zone around each disc was measured.

Table 1 shows the results.

Table 1

Antibiotic	Diameter of clear zone in mm
A	0
B	24
C	11
D	18

0 3 . 1

Which antibiotic should the doctor prescribe for this patient?
Give a reason for your answer.

.....

.....

.....

.....

[2 marks]

0 3 . 2

Suggest why there was no clear zone around antibiotic A.

.....

.....

[1 mark]

0 3 . 3

Calculate the area of the clear zone around disc B.
Use the equation:
 $\text{area} = \pi r^2$

.....

.....

.....

.....

Area = mm²
[2 marks]

0 3 . 4

The doctor told the patient to take all of the antibiotic tablets, even after they started to feel better.
Suggest why.

.....

.....

.....

.....

[2 marks]

0 4

A patient has a throat infection caused by a bacterium. A doctor prescribes an antibiotic and tells the patient to take a painkiller as well.

0 4 . 1

Explain why the doctor must choose an antibiotic that is effective against the specific bacterium causing the infection.

.....

.....

.....

.....

[2 marks]

0 4 . 2

Explain the different roles of the antibiotic and the painkiller in treating the patient.

[2 marks]

0 4 . 3

The use of antibiotics has greatly reduced deaths from bacterial diseases. Give **one** reason why scientists are concerned about the future use of antibiotics.

[1 mark]

0 4 . 4

It is difficult to develop drugs that kill viruses. Explain why.

[2 marks]

0 5

Table 2 shows the mean diameter of the clear zone (no bacterial growth) around discs containing four antibiotics, tested against two different species of bacterium.

Table 2

Antibiotic	Zone diameter against bacterium P in mm	Zone diameter against bacterium Q in mm
A	22	0
B	15	18
C	0	9
D	19	20

0 5 . 1

Which antibiotic would be most suitable to treat an infection caused by bacterium Q?

.....

.....

[1 mark]

0 5 . 2

Antibiotic A produced a large clear zone against bacterium P but no clear zone against bacterium Q.
Suggest why.

.....

.....

.....

.....

[2 marks]

0 5 . 3

Calculate the percentage by which the zone diameter for antibiotic D against bacterium Q is greater than for antibiotic B against bacterium Q.

.....

.....

.....

.....

Percentage = %

[2 marks]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: Antibiotics and painkillers · 28 marks

Question 1 (4 marks)

01.1 [1 mark]

Correct: An antibiotic is effective against a specific type, or a few types, of bacteria.

01.2 [1 mark]

Answer: Paracetamol (or ibuprofen / aspirin)

- paracetamol / ibuprofen / aspirin (1)

Notes: Allow any other correct named painkiller.

01.3 [2 marks]

- different antibiotics are effective against different types of bacteria (1)
 - using an antibiotic that is not effective against that bacterium will not cure the infection (1)
-

Question 2 (5 marks)

02.1 [1 mark]

Correct: Kill bacteria inside the body

02.2 [1 mark]

Answer: Penicillin

- penicillin (1)

Notes: Allow any other named antibiotic, e.g. amoxicillin.

02.3 [2 marks]

- painkillers only treat the symptoms (1)
 - (they) do not kill the pathogen / virus (1)
-

02.4 [1 mark]

- colds are caused by viruses and antibiotics do not kill viruses (1)
-

Question 3 (7 marks)

03.1 [2 marks]

- B (1)
- (it had the) largest clear zone, so it killed the most bacteria / this bacterium is most sensitive to B (1)

03.2 [1 mark]

- the bacteria are resistant to antibiotic A / antibiotic A does not kill this type of bacterium (1)

03.3 [2 marks]

Answer: 452 mm^2

- radius = $12 \text{ (mm)} / \pi \times 12^2$ (1)
- $452 \text{ (mm}^2\text{)}$ (1)

Notes: Allow 452.2 (using $\pi = 3.14$). An answer of 1810 (1809.6) scores 1 mark (diameter used instead of radius).

03.4 [2 marks]

- to make sure all the bacteria are killed (1)
- (so) no bacteria survive to reproduce / cause the infection again / become resistant (1)

Question 4 (7 marks)

04.1 [2 marks]

- different antibiotics kill different types of bacteria / specific bacteria must be treated with specific antibiotics (1)
- (otherwise) the bacteria would not be killed and the infection would not be cured (1)

04.2 [2 marks]

- the antibiotic kills the bacteria (causing the infection) (1)
- the painkiller relieves the symptoms / pain but does not kill the bacteria (1)

04.3 [1 mark]

- strains of bacteria resistant to antibiotics are emerging / becoming more common (1)

04.4 [2 marks]

- viruses live / reproduce inside the body's cells (1)
 - (so) drugs that kill viruses may also damage the body's cells / tissues (1)
-

Question 5 (5 marks)

05.1 [1 mark]

Answer: D

- D (it has the largest zone against Q, 20 mm) (1)
-

05.2 [2 marks]

- bacterium Q is resistant to antibiotic A / lacks the target that antibiotic A affects in bacterium P (1)
 - different types of bacteria can respond differently to the same antibiotic (1)
-

05.3 [2 marks]

Answer: 11.1%

- $(20 - 18) \div 18 \times 100$ (1)
 - 11.1 (%) (1)
-