

GCSE Biology

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** _____

- 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.

0 1

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

0 1 . 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]

0 1 . 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 Biology · 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)
-